ORDER NO. ARD81060060C8-18

Service Manual

Cassette Deck

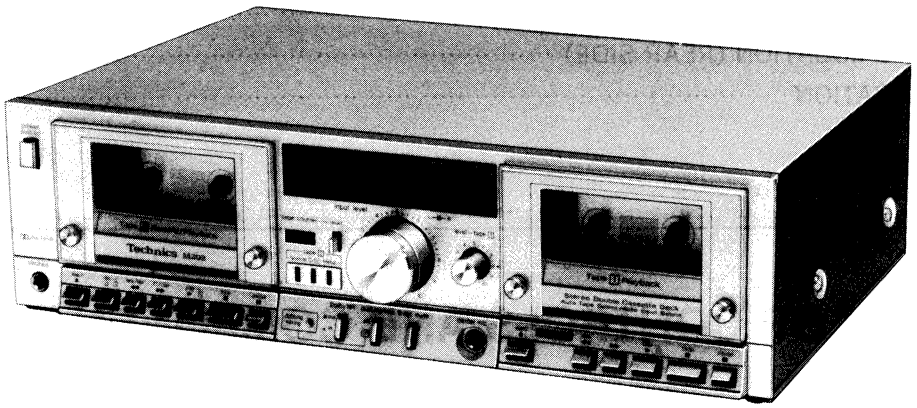
RS-M202

(Silver Face)

Metal Tape Compatible Stereo
Double Cassette Deck with Dubbing Function

This is the Service Manual for the following areas.
[D] ..... For all European areas.
[N] ..... For Asia, Latin America, Middle East and Africa areas.
[A] ..... For Australia.

DOLBY SYSTEM



RS-M24 MECHANISM SERIES

Specifications

Track system:	Tape Deck 1; 4-track 2-channel stereo playback Tape Deck 2; 4-track 2-channel stereo recording and playback
Wow and flutter:	0.048% (WRMS) ±0.14% (DIN)
Tape speed:	4.8 cm/s
Frequency response:	Metal tape; 20—18,000 Hz 30—17,000 Hz (DIN) CrO_2 tape; 20—18,000 Hz 30—16,000 Hz (DIN) Normal tape; 20—17,000 Hz 30—15,000 Hz (DIN)
Signal-to-noise ratio:	Dolby NR in; 67 dB (above 5 kHz) Dolby NR out; 57 dB (signal level=max. recording level, CrO_2 type tape)
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Inputs:	MIC; sensitivity 1.0 mV, input impedance 15 kΩ applicable microphone impedance 400Ω—10 kΩ LINE; sensitivity 60 mV, input impedance 47 kΩ
Outputs:	LINE; output level 400 mV, output impedance 2.2 kΩ or less load impedance 22 kΩ over HEADPHONES; output level 80 mV, load impedance 8Ω
Bias frequency:	80 kHz
Motor:	Electrical DC governor motor
Heads:	Tape Deck 1; 1 SX head for playback Tape Deck 2; 1 SX head for playback and recording 1 double-gap ferrite head for erasure
Power requirements:	AC 110/125/220/240 V, 50-60 Hz Pre-set power voltage 240 V Pre-set power voltage 220 V for Europe
Power consumption:	10 W 12 W for Europe and Australia
Dimensions:	43 cm(W)×11.9 cm(H)×28.7 cm(D)
Weight:	5.7 kg

Specifications are subject to change without notice.
* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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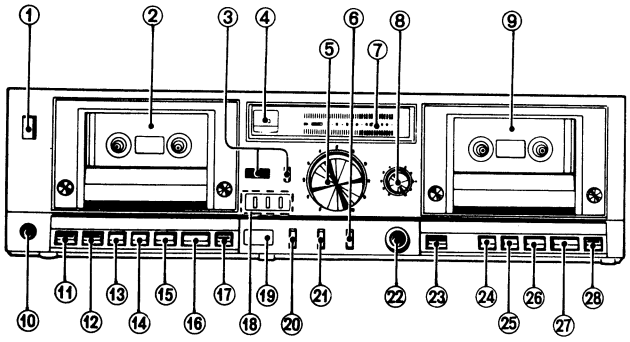
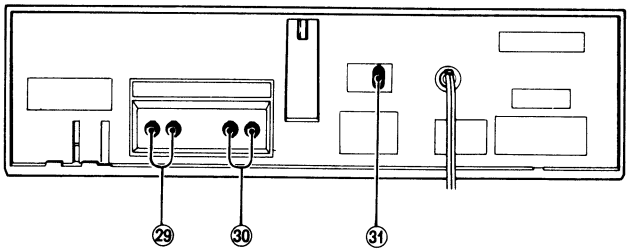
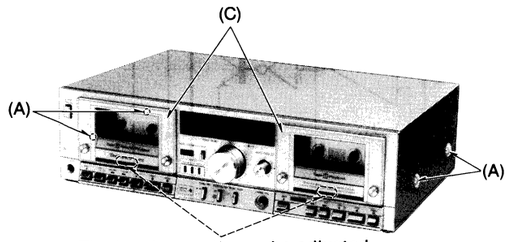
LOCATION OF CONTROLS AND COMPONENTS





① Power switch [power (push on)]
② Cassette holder
③ Tape counter and Reset button [(tape counter—reset)]
④ Recording indicator (rec)
⑤ Input level controls [input level (L⇄R)]
⑥ Record-muting switch [rec mute (O)]
⑦ Fluorescent level meter
⑧ Tape 1 level control [level—tape 1]
⑨ Cassette holder
⑩ Headphones jack [phones]
⑪ Eject button [eject (▲)]
⑫ Record button [rec (○)·(◥)]
⑬ Rewind/Review button [rew/rev (◀◀)]
⑭ Fast forward/Cue button [ff/cue (▶▶)]
⑮ Play button [play (▶)·◥]
⑯ Stop button [stop (■)]
⑰ Pause button [pause (❚❚)]
⑱ Auto tape selection indicators [tape 2 (Normal·CrO_2 Metal)]
⑲ Dubbing/Mixing indicator [dubbing mixing]
⑳ Dolby NR switch [Dolby NR (out·in)]
㉑ Dubbing/mixing switch [dubbing/mix (off ()·on ()]
㉒ Center microphone jack [center mic]
㉓ Eject button [eject (▲)]
㉔ Rewind button [rew (◀◀)]
㉕ Fast forward button [ff (▶▶)]
㉖ Play button [play (▶)·(◥)]
㉗ Stop button [stop (■)]
㉘ Pause button [pause (II)]
㉙ Line output jacks [LINE OUT (R·L)]
㉚ Line input jacks [LINE IN (R·L)]
㉛ Voltage selector [VOLTAGE SELECTOR]

DISASSEMBLY INSTRUCTIONS



* The head azimuth can be adjusted by removing the cassette lid

Fig. 1

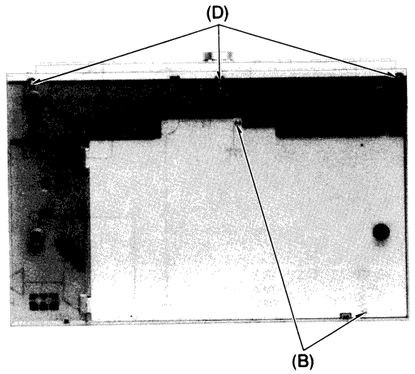


Fig. 2

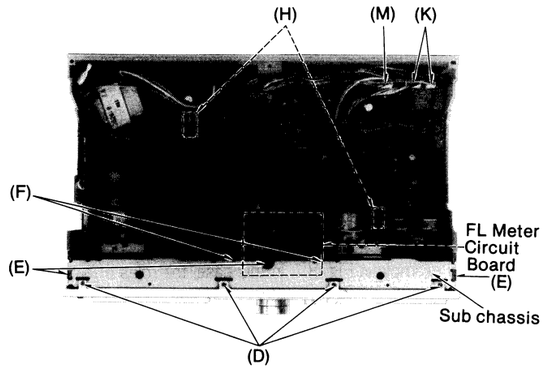


Fig. 3

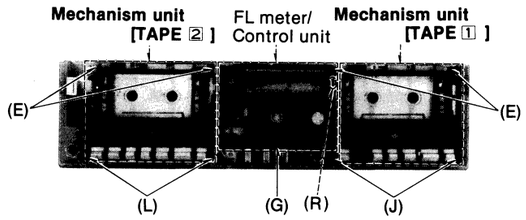


Fig. 4

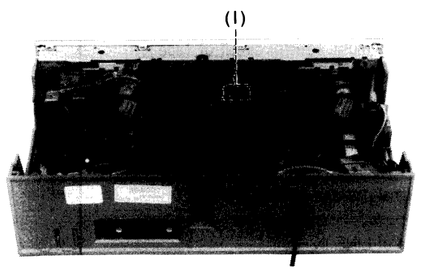


Fig. 5

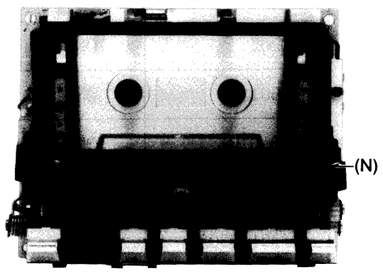


Fig. 6

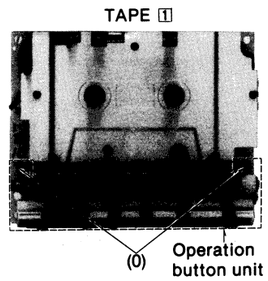


Fig. 7

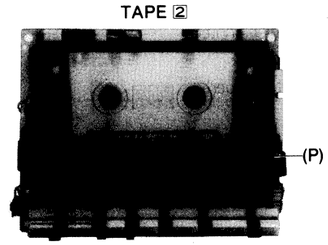


Fig. 8

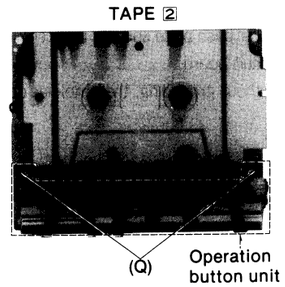
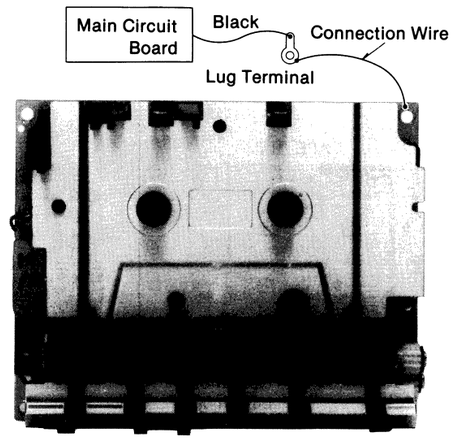


Fig. 9

Ref. No.	Procedure	To remove —— .	Remove —— .	Shown in fig. —— .
1	1	Case cover	• 4 screws ····· (A)	1
2	2	Bottom cover	• 2 screws ····· (B)	2
3	1→3	Front panel	• 2 cassette lids ····· (C) • 7 screws ····· (D)	1 2, 3
4	1→3→4	Sub chassis	• 7 screws ····· (E) • 2 holders ····· (F)	3, 4 3
5	1→2→3→4→5	FL meter/control unit	• Screw ····· (G) • 2 connectors ····· (H) • Counter belt ····· (I)	4 3 5
6	1→2→3→4→5→6	Mechanism unit [TAPE 1]	• 2 screws ····· (J) • 2 connectors ····· (K)	4 3
7	1→2→3→4→5→7	Mechanism unit [TAPE 2]	• 2 red screws ····· (L) • Connector ····· (M)	4 3
8	1→2→3→4→5→6→8	Operation button unit [TAPE 1]	• Cassette holder ····· (N) • 2 screws ····· (O)	6 7
9	1→2→3→4→5→7→9	Operation button unit [TAPE 2]	• Cassette holder ····· (P) • 2 screws ····· (Q)	8 9
10	1→2→3→4→5→10	FL meter circuit board	• Holder ····· (R)	4

MECHANISM SECTION

1. For repair, measurement or adjustment with the mechanism removed from the unit be sure to ground the lower base plate of the mechanism.
2. For grounding, connect a extension cord to the mechanism's lower base plate and the Lug terminal from amplifier printed circuit board.
3. Without grounding, the amplifier does not operate properly.



TECHNICAL EXPLANATION

1. MUSIC SELECTOR OPERATION

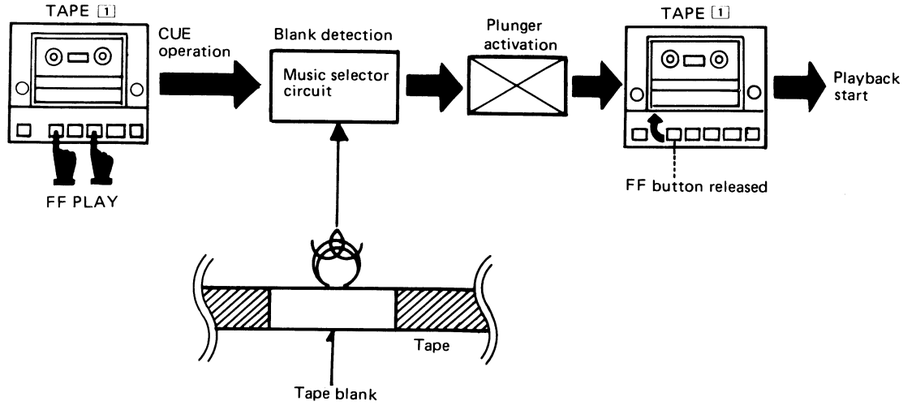
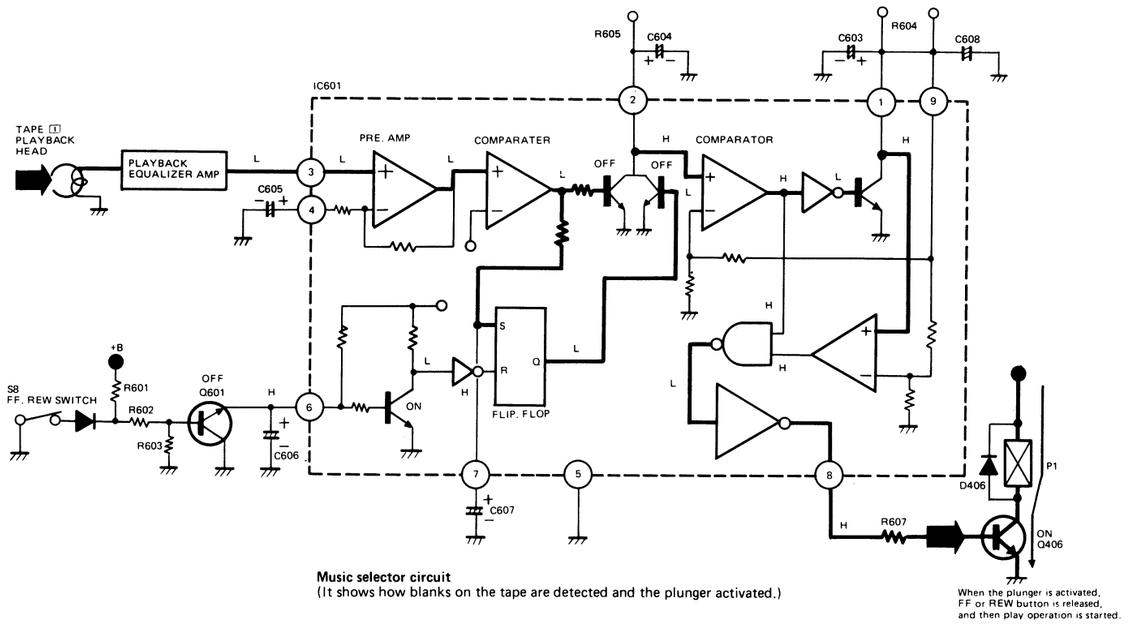


Fig. 1

The music selector serves to find the blank between recorded music so that the music is started from the beginning. This function is performed by the mechanism on "Tape [1]" side.
When it is locked, the tape is rewound (or fast-fed) and stops at the music start position; then the music is automatically started.

It is also possible to keep the tape stopped at the music start position by depressing the pause button. When both play button and rewind button (or FF button) are depressed at the same time, the tape is rewound (or fast-fed) and automatically stops at the tape blank. Then only the rewind (or FF button) returns to the original position.
At that time, the tape is at the music start position, and the music is played when the pause button is released.

The music selector switch is shown in Fig. 2.
When the playback head comes to the blank segment of the tape, the output signal level of the playback head decreases.
The "L" signal is applied to input terminal 3 of IC601 and, as shown in Fig. 2, the signal is digitally treated in IC, and the potential of IC output terminal 8 becomes "H"; then the plunger is activated.



Music selector circuit
(It shows how blanks on the tape are detected and the plunger activated.)

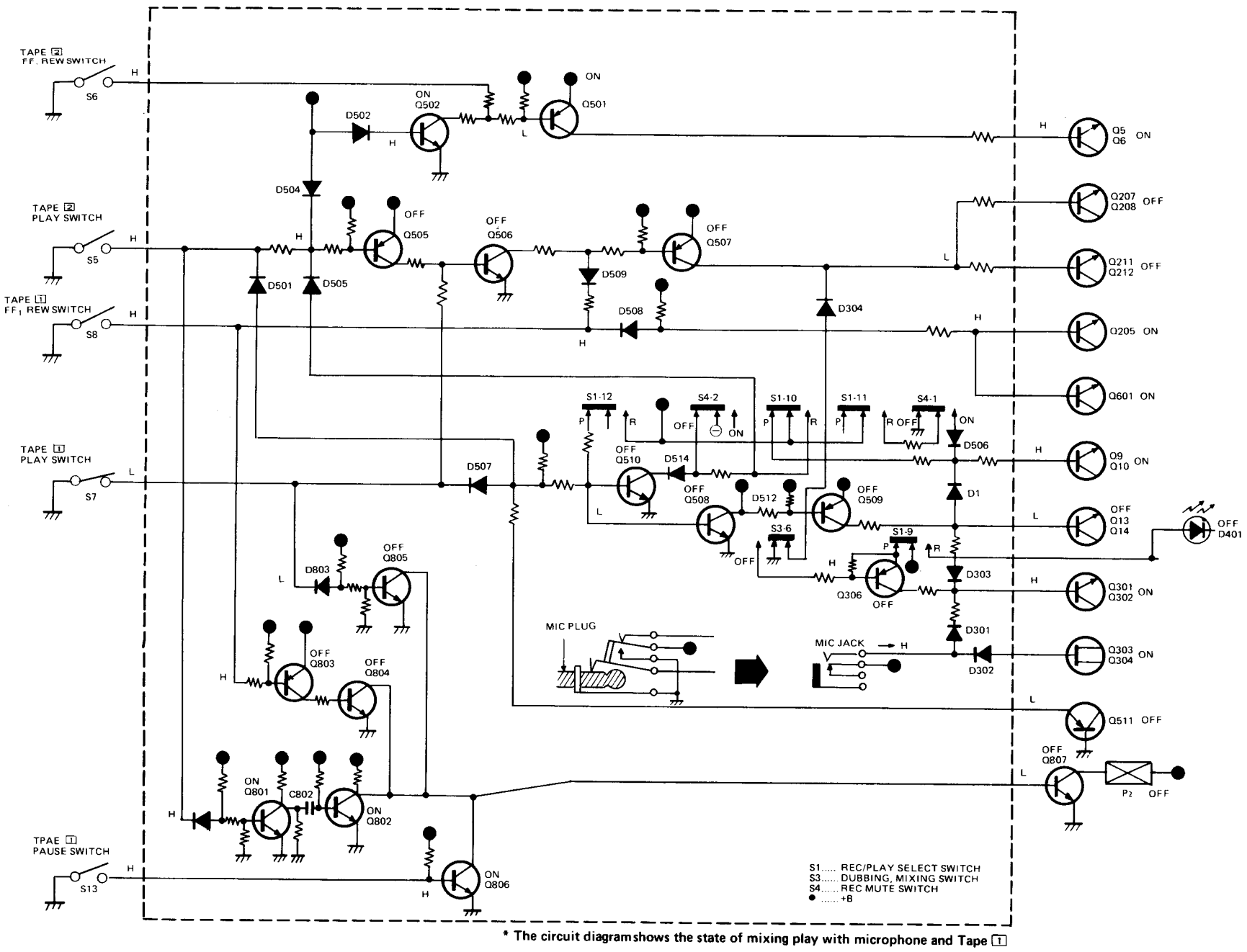
Fig. 2

2. CONTROL CIRCUIT OPERATION

The control circuit and control button switches (S5, S6, S7, S8, S13) are shown in Fig. 3.
As is seen in the connection of this circuit, the states of the output transistors are determined by the combination of control button switches, S1, S3, S4, mic jack switch.
The state of the circuit during mixing play of mic and tape is shown as a typical example in Fig. 3. In this case, the roles of output transistors are as follows:

Ref. No.	State	Role of transistor
Q5, Q6	ON	To mute the play signal passage of Tape [2].
Q207, Q208	OFF	To cancel the muting of signal passage of Tape [1].
Q211, Q212	OFF	To cancel the muting of signal passage of Tape [1].
Q205	ON	To mute the signal passage to music selector circuit of Tape [1].
Q601	ON	To block the operation of music selector circuit.
Q9, Q10	ON	To mute the record signal passage of Tape [2].
Q13, Q14	OFF	To cancel the muting of signal passage of LINE IN.
Q301, Q302	ON	To mute the signal passage of LINE IN.
Q303, Q304	ON	To cancel the signal passage muting of MIC.
Q511	OFF	To allow the signal to the signal passage that leads to the meter circuit. (When Q511 is ON, "H" signal from emitter of Q511 is applied to the meter circuit; then all the digits of FL meter light up.)
Q807	OFF	To cut off the current to the plunger.

CONTROL CIRCUIT OF RS-M202



* The circuit diagramshows the state of mixing play with microphone and Tape 1

Fig. 3

3. BLOCK DIAGRAM OF RS-M202

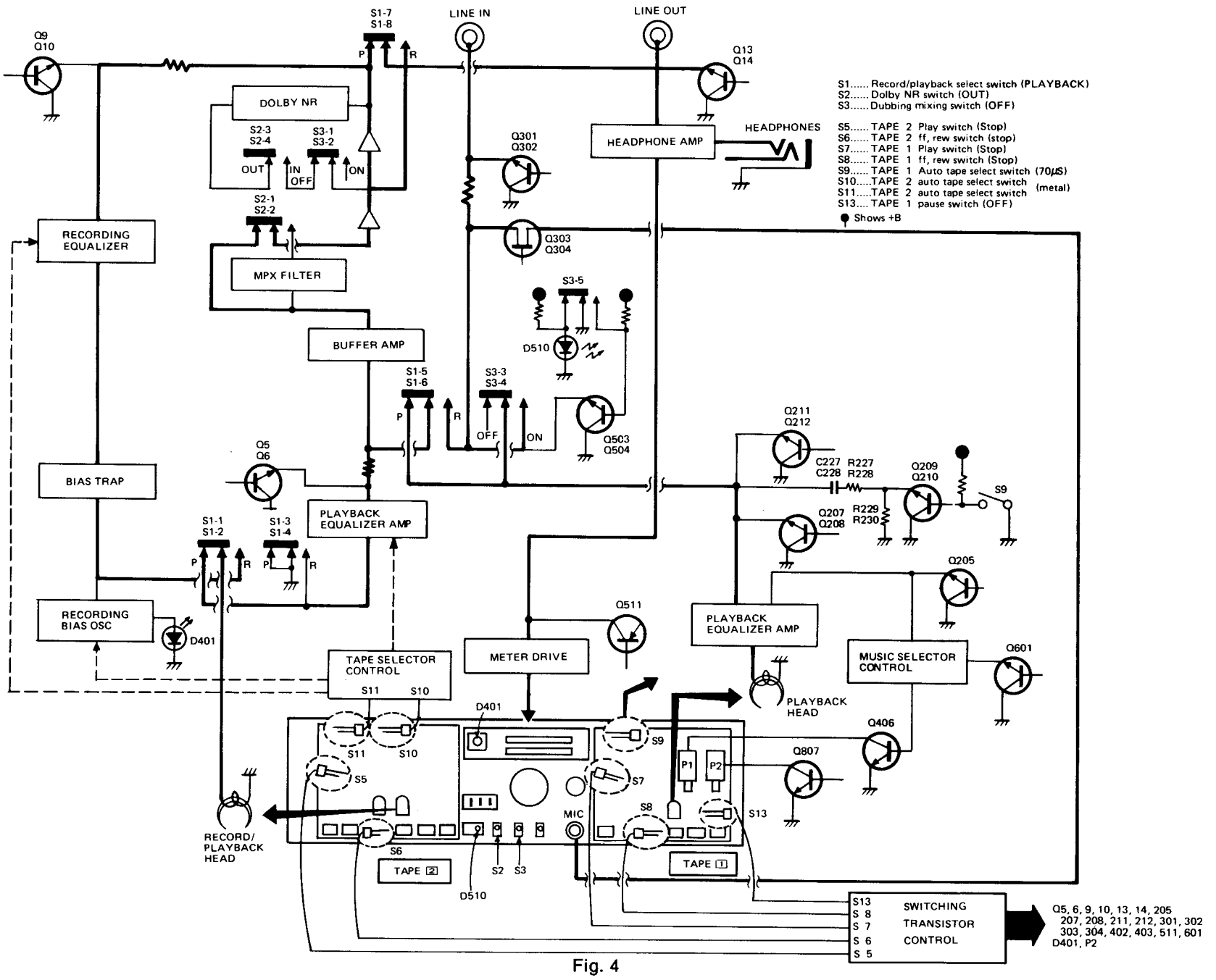
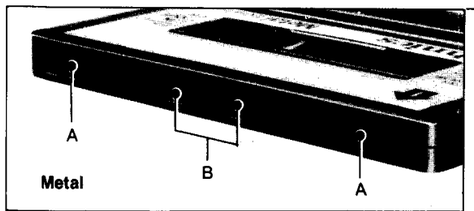
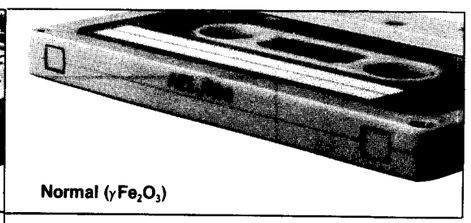


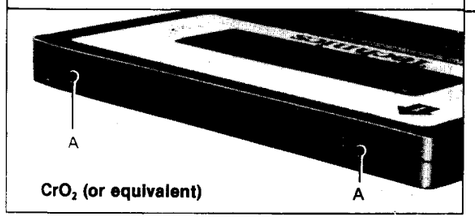
Fig. 4

4. AUTO TAPE SELECTOR

This unit is equipped with an auto-tape selector system that detects these identification recesses and automatically selects the correct bias and equalization for normal, CrO_2 and metal tape varieties. Thus, the novice user can obtain the correct tape selector setting automatically to ensure proper recording and playback results.



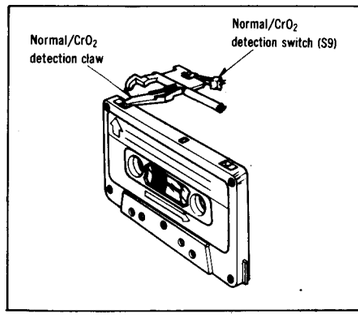




Type \ Recess	A	B
Metal	YES	YES
CrO_2	YES	NO
Normal	NO	NO

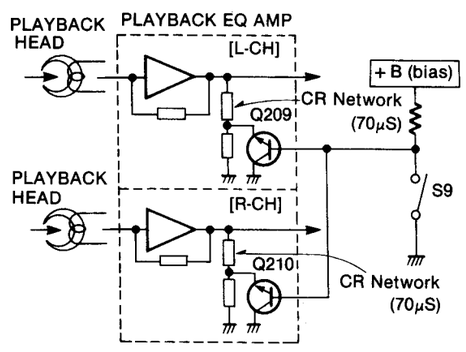
TAPE 1 (PLAYBACK DECK)

– MECHANICAL SECTION –



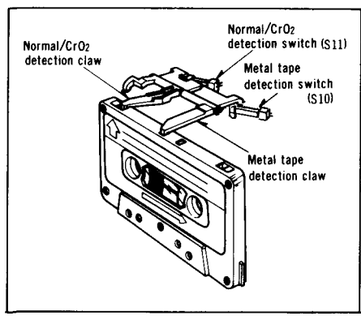
S9	Mode
	Normal tape mode
	CrO_2, Metal tape mode

– ELECTRICAL SECTION –



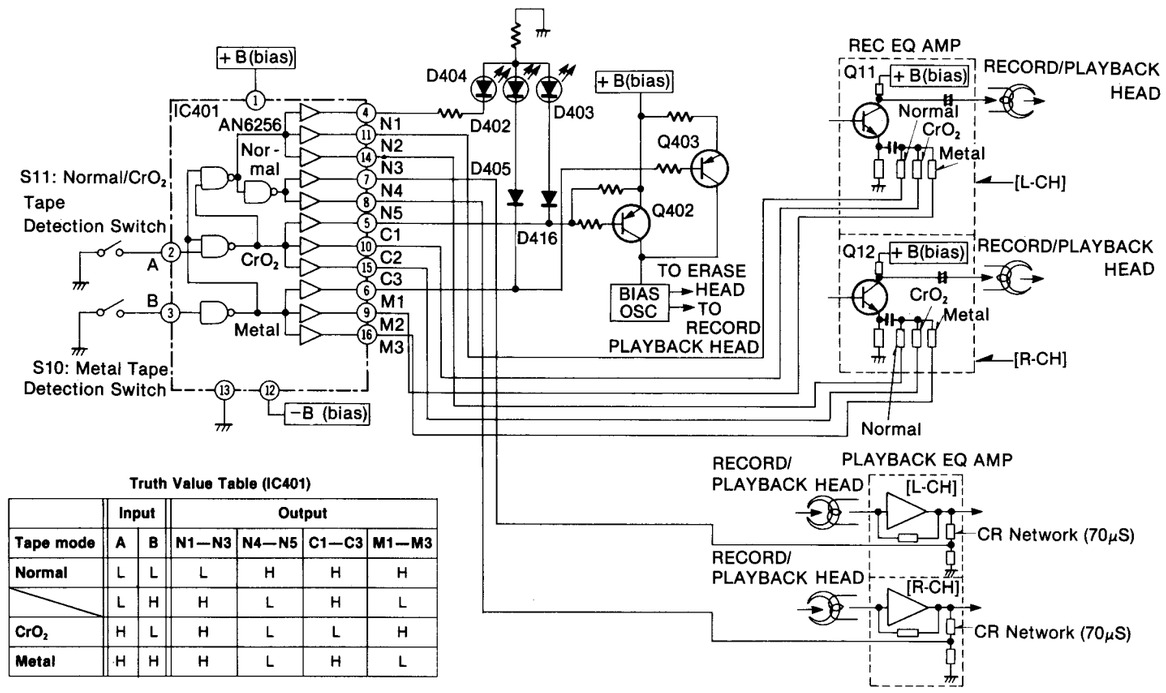
TAPE 2 (RECORD/PLAYBACK DECK)

– MECHANICAL SECTION –


Normal/CrO2 detection switch (S11)
Normal/CrO2 detection claw
Metal tape detection switch (S10)
Metal tape detection claw

S10	S11	Mode
		Normal tape mode
		CrO_2 tape mode
		Metal tape mode

– ELECTRICAL SECTION –



Truth Value Table (IC401)

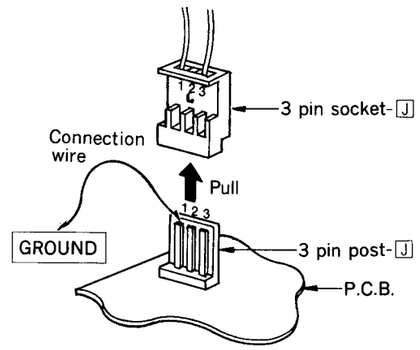
	Input		Output			
Tape mode	A	B	N1—N3	N4—N5	C1—C3	M1—M3
Normal	L	L	L	H	H	H
	L	H	H	L	H	L
CrO_2	H	L	H	L	L	H
Metal	H	H	H	L	H	L

MEASUREMENT AND ADJUSTMENT METHODS

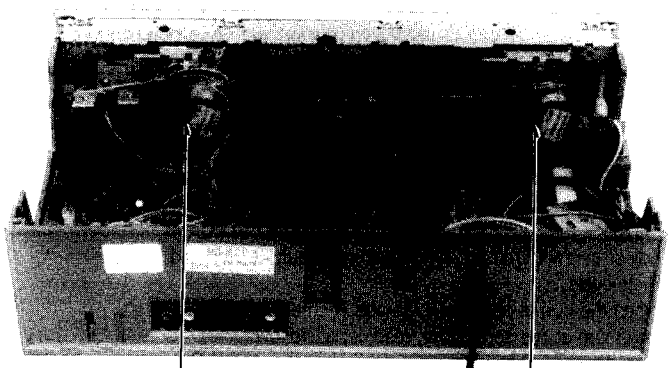
Tape Selector (Tape Mode Switching)

For measurement adjustment with test tapes without tape detection holes (A and B), switch tape modes as follows.
(For normal tape mode, just insert a normal tape into the cassette holder.)

* Metal tape mode setting:
  Metal tape mode is obtained by disconnecting the 3 pin socket J from the 3 pin post J on the P.C.B. (Printed Circuit Board).
* CrO_2 tape mode setting:
  First, disconnect the 3 pin socket J in the same way as above. Then, as illustrated in the figure right, connect the terminal-1 of the 3 pin post to the ground with a connection wire.



ADJUSTMENT PARTS LOCATION



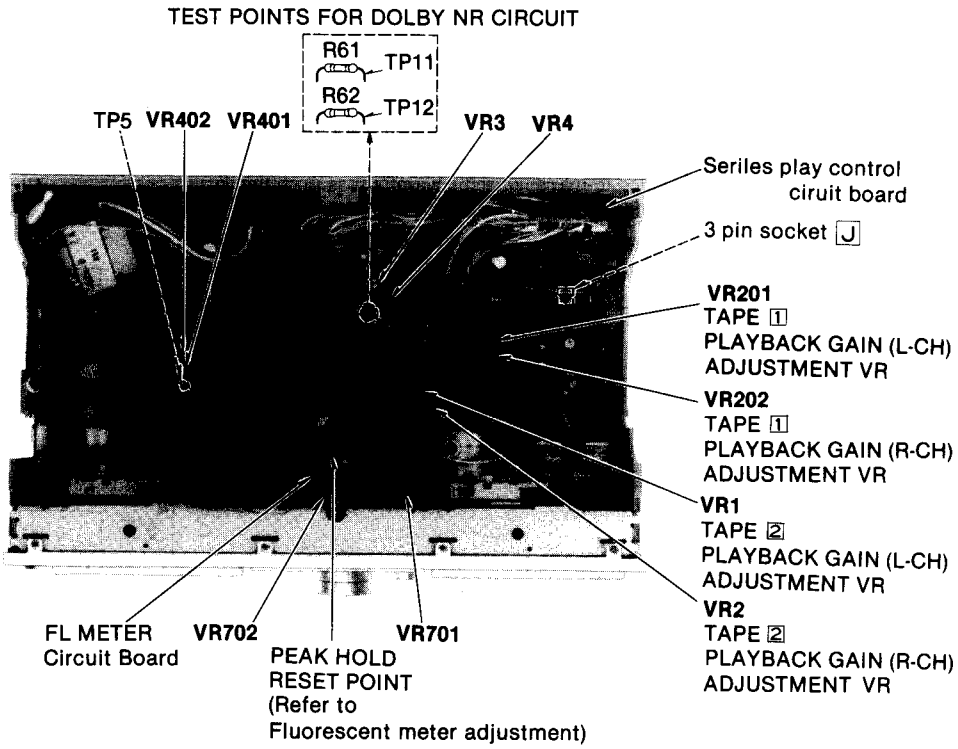
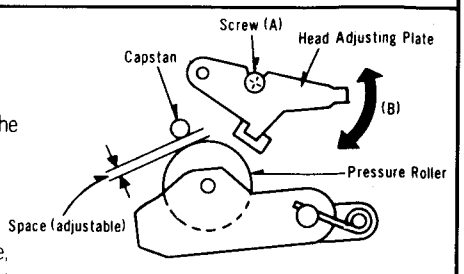
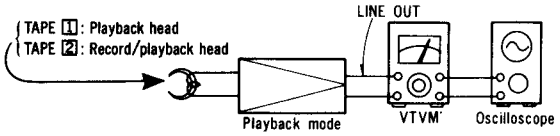
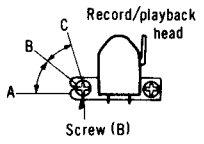
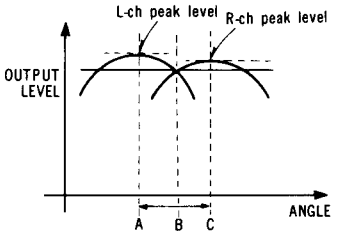
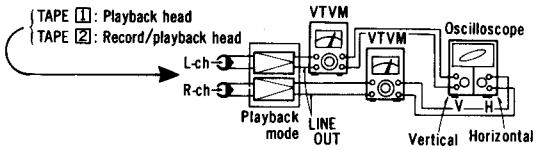
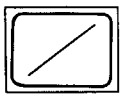
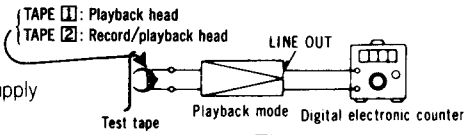


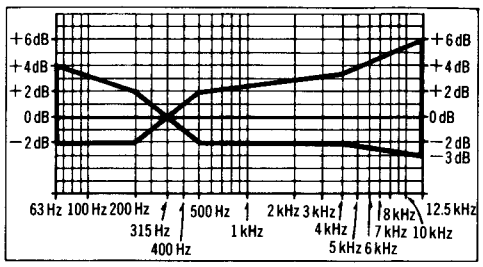
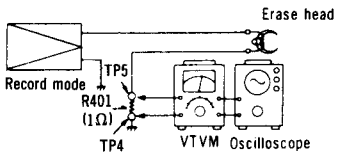
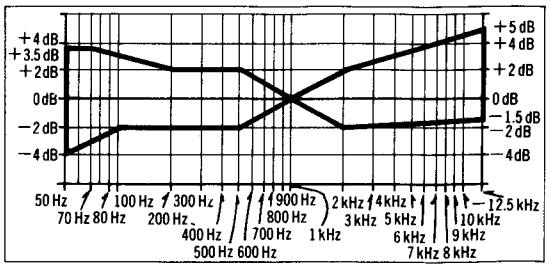
Fig. 1

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20±5°C (68±9°F)
- Dolby NR switch: OUT
- Input selector: Line in
- Input level controls: Maximum
- TAPE 1 level control: Maximum
- Dubbing/Mixing switch: OFF

ITEM	MEASUREMENT & ADJUSTMENT
Ⓐ Head position adjustment **[TAPE 1, TAPE 2]** Condition: * Playback and pause mode	(The head adjusting plate is provided to adjust the tape touch of the head in cue or review mode.) 1. Press the playback button and pause button. 2. Measure the space between the pressure roller and the capstan. **Standard value: 0.5±0.3mm** 3. If the measured value is not within the standard value, untighten screw (A), and slide the head adjusting plate in the direction of arrow (B) for adjustment.  **Fig. 2**

ITEM	MEASUREMENT & ADJUSTMENT
Ⓑ Head azimuth adjustment **[TAPE 1, TAPE 2]** Condition: • Playback mode Equipment: • VTVM • Oscilloscope • Test tape (azimuth) ··· QZZCFM	**L-ch/R-ch output balance adjustment** 1. Make connections as shown in fiig. 3.  Fig. 3 2. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) in fig. 4 for maximum output L-ch and R-ch levels. When the output levels of L-ch and R-ch are not at maximum at the same time, readjust as follows. 3. Turn the screw shown in fig. 4 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate the angle B between angles A and C, i.e., a point where L-ch and R-ch output levels come together at maximum. (Refer to figs. 4 and 5.)  Fig. 4  Fig. 5 **L-ch/R-ch phase adjustment** 4. Make connections as shown in fig. 6. 5. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 4 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 7 is obtained on the oscilloscope.  Fig. 6  Fig. 7
Ⓒ Tape speed **[TAPE 1, TAPE 2]** Condition: • Playback mode Equipment: • Digital electronic counter or frequency counter • Test tape ··· QZZCWAT	**Tape speed accuracy**  Fig. 8 1. Test equipment connection is shown in fig. 8. 2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to frequency counter. 3. Take measurement at middle section of tape. 4. Measure this frequency. 5. On the basis of 3,000Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\,(\%)$ where, f = measured value **Standard value:** TAPE 1 (Playback Deck) +1.83% — −1.16%; TAPE 2 (Record/Playback) +1.33% — −1.67% **Adjustment method** 1. Playback the test tape (middle). 2. Adjust so that frequency becomes 3,000Hz. 3. Tape speed adjustment VR shown in fig. 1. **Tape speed fluctuation** Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3{,}000} \times 100\,(\%)$ f_1 = maximum value, f_2 = minimum value **Standard value: Less than 1%** **Note:** Please use non metal type screwdriver when you adjust tape speed on this unit.

ITEM	MEASUREMENT & ADJUSTMENT
Ⓓ Playback frequency response **[TAPE 1, TAPE 2]** Condition: • Playback mode • Normal tape mode • TAPE 1 level control ··· MAX Equipment: • VTVM • Oscilloscope • Test tape ··· QZZCFM	1. Test equipment connection is shown in fig. 3. 2. Place UNIT into Normal tape mode. 3. Playback the frequency response test tape (QZZCFM). 4. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT. 5. Make measurement for both channels. 6. Make sure that the measured value is within the range specified in the frequency response chart (shown in fig. 9). **Playback frequency response chart [TAPE 1, TAPE 2]**  **Fig. 9**
Ⓔ Playback gain **[TAPE 1, TAPE 2]** Condition: • Playback mode • Normal tape mode • TAPE 1 level control ··· MAX Equipment: • VTVM • Oscilloscope • Test tape ··· QZZCFM	1. Test equipment connection is shown in fig. 3. 2. Playback standard recording level portion on test tape (QZZCFM 315Hz, 0dB), and using VTVM measure the output level at LINE OUT. 3. Make measurement for both channels. **Standard value: TAPE 1: 0.59V±1dB, TAPE 2: 0.38V±1dB** **Adjustment** 1. If measured value is not within standard, adjust VR201 (TAPE 1: L-CH), VR202 (TAPE 1: R-CH), VR1 (TAPE 2: L-CH), VR2 (TAPE 2: R-CH). 2. After adjustment check"Playback frequency response" again.
Ⓕ Erase current **[TAPE 2]** Condition: • Record mode • Metal tape mode Equipment: • VTVM • Oscilloscope	1. Test equipment connection is shown in fig. 10. 2. Place UNIT into Metal tape mode. 3. Press the record and pause buttons. 4. Read voltage on VTVM and calculate erase current by following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of R401}}{1\,(\Omega)}$ **Standard value: 160^{+10}_{-20}mA (Metal position)**  **Fig. 10** 5. If measured value is not within standard, adjust as follows. **Adjustment** 1. Open the point (A) and short the point (B) on the main circuit board in the circuit board diagram (See page 12). 2. Make measurement for erase current. 3. Make sure that the measured value is within the erase current of 140mA to 170mA. 4. If it is beyond the value, carry out the following adjustments: • If the erase current is less than 140mA, short the point (A). • If the erase current is more than 170mA, open the points (A) and (B).
Ⓖ Overall frequency response **[TAPE 2]** Condition: • Record/playback mode • Normal tape mode • CrO_2 tape mode • Metal tape mode • Input level controls ··· MAX	**Note** Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response). **Overall frequency response chart (Normal) [TAPE 2]**  **Fig. 11**

ITEM	MEASUREMENT & ADJUSTMENT
Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω) * Test tape (reference blank tape) ···QZZCRA for Normal ···QZZCRX for CrO_2 ···QZZCRZ for Metal	**Overall frequency response adjustment by recording bias current**

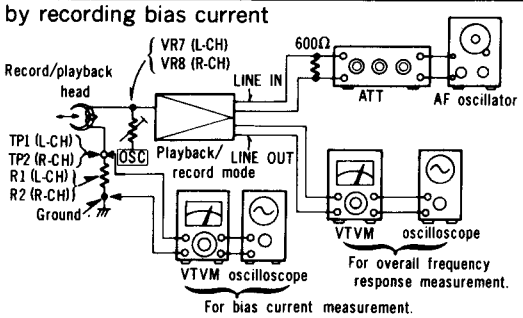


Fig. 12

(Recording equalizer is fixed.)

1. Make connections as shown in fig. 12.
2. Place UNIT into normal tape mode and load the test tape (QZZCRA).
3. Input a 1kHz, −24dB signal through LINE IN. Place the set in record mode.
4. Fine adjust the attenuator to obtain 0.4V LINE OUT output.
   * Make sure that the input signal level is −24±4dB with 0.4V output voltage.
5. Adjust the attenuator to reduce the input signal level by 20dB.
6. Adjust the AF oscillator to generate 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz signals, and record these signals on the test tape.
7. Playback the signals recorded in step 6, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 11).
   (If the curve is within the charted specifications, proceed to steps 8, 9 and 10.)
   If the curve is not within the charted specifications, adjust as follows;

Adjustment Ⓐ:
When the curve exceeds the overall frequency response chart specifications (fig. 11) as shown in fig. 13.

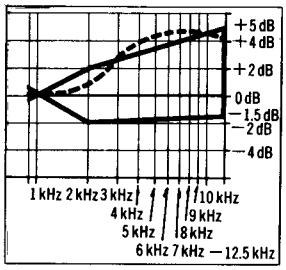


Fig. 13

1) Increase bias current by turning VR401 (L-CH) and VR402 (R-CH). (See fig. 1 on page 3.)
2) Repeat steps 6 and 7 to confirm. (Proceed to steps 8, 9 and 10 if the curve is now within the charted specifications in fig. 11.)
3) If the curve still exceeds the specifications (fig. 11), increase bias current further and repeat steps 6 and 7.

Adjustment Ⓑ:
When the curve falls below the overall frequency response chart specifications (fig. 11) as shown in fig. 14.

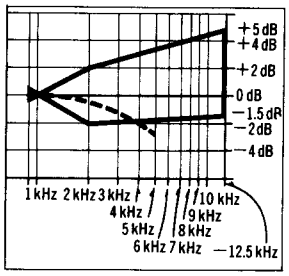


Fig. 14

1) Reduce bias current by turning VR401(L-CH) and VR402 (R-CH).
2) Repeat steps 6 and 7 to confirm. (Proceed to steps 8, 9 and 10 if the curve is now within the charted specifications in fig. 11.)
3) If the curve still falls below the charted specifications (fig. 11), reduce bias current further and repeat steps 6 and 7.

8. Place UNIT into CrO_2 tape mode.
9. Change test tape to QZZCRX, and record 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO_2 tapes (fig. 15).

Overall frequency response chart
(CrO_2, Metal) [TAPE 2]

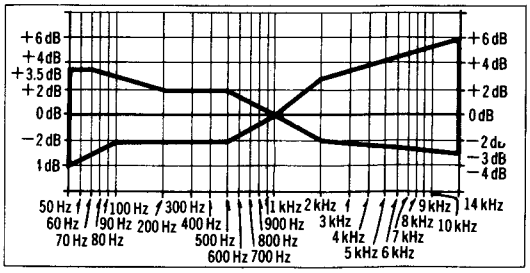


Fig. 15

RS-M202

SCHEMATIC DIAGRAM

MAIN CIRCUIT SECTION

$Q_{1,2}$ 2SB745(T,U) [2SB745T]
$Q_{3,4}$ 2SD636H(T,U) [2SD661T]
$Q_{5,6}$ 2SD636(R,S) [2SD636R]
$Q_{7,8}$ 2SD636H(R,S) [2SD636HR]
$Q_{9,10}$ 2SD636(R,S) [2SD636R]
$Q_{11,12}$ 2SD636H(R,S) [2SD636HR]
$Q_{13,14}$ 2SC1684(R,S,T) or 2SC945(P,K) [2SC945-Q]

IC1,2

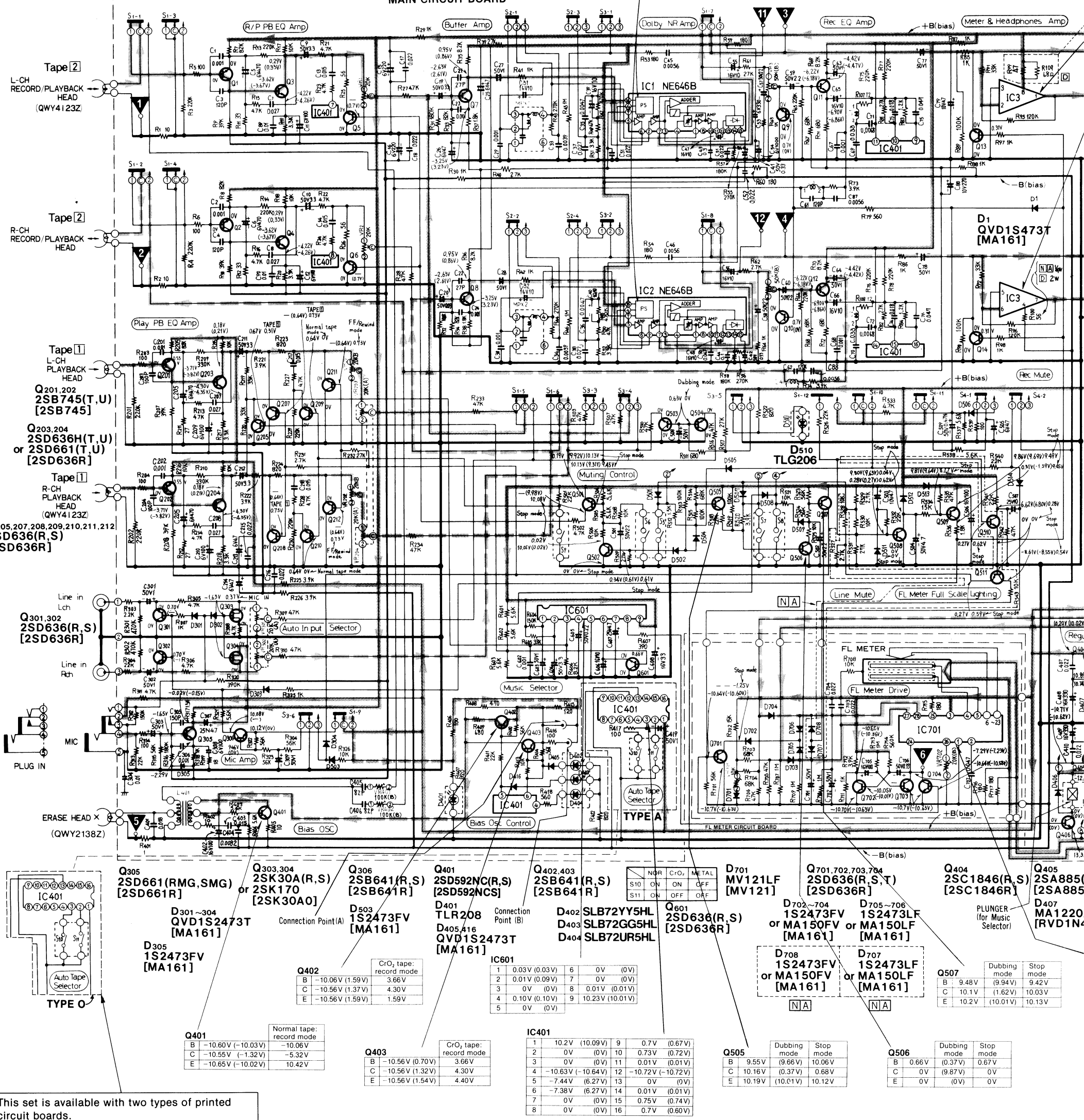
1	0.01V (0.01V)	9	−5.5V (−5.46V)
2	0V (0V)	10	0V (0.01V)
3	−0.03V (−0.03V)	11	0.1V (0.11V)
4	0V (0V)	12	0V (0V)
5	0.02V (0.02V)	13	( )
6	0.17V (0.17V)	14	0.02V (0.03V)
7	−0.11V (0.12V)	15	0.02V (0.03V)
8	( )	16	5.1V (4.96V)

IC3

1	0.01
2	0.01
3	0
4	10.25

IC3

MAIN CIRCUIT BOARD



	NOR	CrO_2	METAL
S10	ON	ON	OFF
S11	ON	OFF	OFF

Q402

		CrO_2 tape: record mode
B	−10.06V (1.59V)	3.66V
C	−10.56V (1.37V)	4.30V
E	−10.56V (1.59V)	1.59V

IC601

1	0.03V (0.03V)	6	0V (0V)
2	0.01V (0.09V)	7	0V (0V)
3	0V (0V)	8	0.01V (0.01V)
4	0.10V (0.10V)	9	10.23V (10.01V)
5	0V (0V)		

Q401

		Normal tape: record mode
B	−10.60V (−10.03V)	−10.06V
C	−10.55V (−1.32V)	−5.32V
E	−10.65V (−10.02V)	10.42V

Q403

		CrO_2 tape: record mode
B	−10.56V (0.70V)	3.66V
C	−10.56V (1.32V)	4.30V
E	−10.56V (1.54V)	4.40V

IC401

1	10.2V (10.09V)	9	0.7V (0.67V)
2	0V (0V)	10	0.73V (0.72V)
3	0V (0V)	11	0.01V (0.01V)
4	−10.63V (−10.64V)	12	−10.72V (−10.72V)
5	−7.44V (6.27V)	13	0V (0V)
6	−7.38V (6.27V)	14	0.01V (0.01V)
7	0V (0V)	15	0.75V (0.74V)
8	0V (0V)	16	0.7V (0.60V)

Q505

		Dubbing mode	Stop mode
B	9.55V	(9.66V)	10.06V
C	10.16V	(0.37V)	0.68V
E	10.19V	(10.01V)	10.12V

Q506

		Dubbing mode	Stop mode
B	0.66V	(0.37V)	0.67V
C	0V	(9.87V)	0V
E	0V	(0V)	0V

Q507

		Dubbing mode	Stop mode
B	9.48V	(9.94V)	9.42V
C	10.1V	(1.62V)	10.03V
E	10.2V	(10.01V)	10.13V

- This set is available with two types of printed circuit boards.
- Type O is identified by a No mark on the main circuit board and type A is identified by a A mark. (Shown in circuit board diagram).
- When servicing refer to respective circuit board diagram and schematic diagram.

NOTES:

- S1-1—S1-12.....Record/playback select switch (shown in playback position).
- S2-1—S2-4 .....Dolby NR IN/OUT select switch (shown in OUT position).
- S3-1—S3-6 .....Dubbing/Mixing switch (shown in OFF position).
- S4-1-S4-2 .....Record muting switch (show in OFF position).
- S5.....TAPE 2 (Record/Playback deck): playback switch (shown in stop mode).
- S6.....TAPE 2 (Record/Playback deck): FF/Rewind switch (shown in OFF position).
- S7.....TAPE 1 (Playback deck): playback switch (shown in OFF position).
- S8.....TAPE 1 (Playback dect): FF/Rewind switch (shown in OFF position).
- S9.....TAPE 1 (Playback deck): playback EQ select switch (shown in 70μs mode).
- 10.....TAPE 2: auto tape select switch.
- S11 .....TAPE 2: auto tape select switch.
- S12 .....Power ON/OFF switch (shown in OFF position).
- S13 .....TAPE 1 (Playback deck): pause switch (shown in OFF position).
- S14 .....AC power voltage select switch.
- VR1, 2 .....TAPE 2 (Record/Playback deck): playback gain adjustment VR.
- VR3, 4 .....TAPE 2 (Record/Playback deck): Recording gain adjustment VR.
- VR201, 202 .....TAPE 1 (Playback deck): Playback gain adjustment VR.
- VR203, 204 .....TAPE 1 (Playback deck): Output level/Dubbing level control.
- VR301, 302 .....Input level controls.
- VR401, 402 .....Recording bias current adjustment VR.
- VR701 .....FL meter adjustment VR (for-20dB indication).
- VR702 .....FL meter adjustment VR (for OdB indication).
- Connection points A and B (for erase current adjustment).
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K...1000Ω, 1M = 1000KΩ.
- Capac P = Pi
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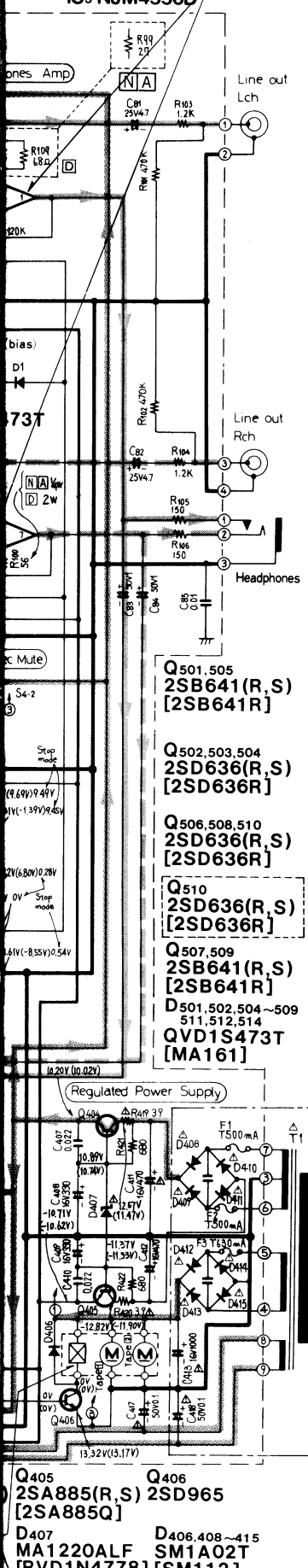
IC3

1	0.01V	(0.01V)	5	0V	(0V)
2	0.01V	(0.01V)	6	0.01V	(0.01V)
3	0V	(0V)	7	0.01V	(0.01V)
4	−10.25V	(−10.19V)	8	9.98V	(9.90V)

IC3 NJM4556D



*** For all European areas.**

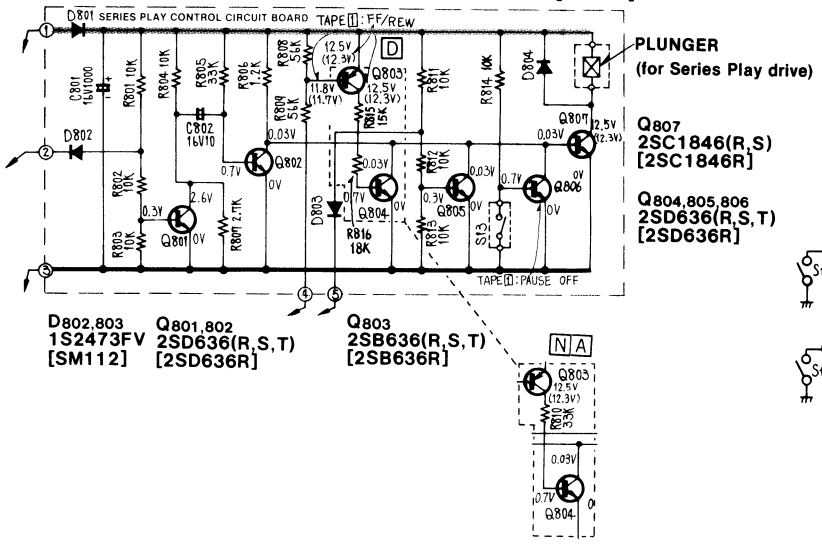
*** For Asia, Latin America, Middle East and Africa areas.**

Q405 2SA885(R,S) [2SA885Q]
Q406 2SD965
D407 MA1220ALF [RVD1N4778]
D406,408~415 SM1A02T [SM112]

Q501,505 2SB641(R,S) [2SB641R]
Q502,503,504 2SD636(R,S) [2SD636R]
Q506,508,510 2SD636(R,S) [2SD636R]
Q510 2SD636(R,S) [2SD636R] NA
Q507,509 2SB641(R,S) [2SB641R]
D501,502,504~509 511,512,514 QVD1S473T [MA161]

SERIES PLAY CONTROL SECTION

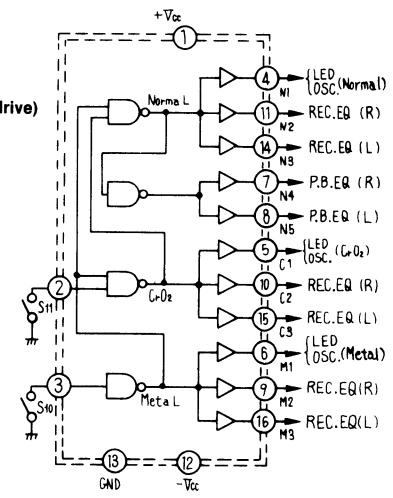
D801 1SR35200FV [MA161]
D804 1SR35200FV [MA161]



Q807 2SC1846(R,S) [2SC1846R]
Q804,805,806 2SD636(R,S,T) [2SD636R]
D802,803 1S2473FV [SM112]
Q801,802 2SD636(R,S,T) [2SD636R]
Q803 2SB636(R,S,T) [2SB636R]

NA

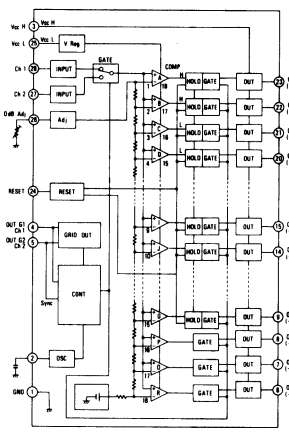
IC401 AN6256



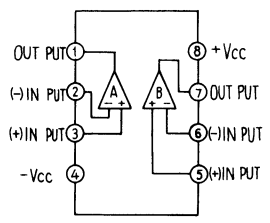
EQUIVALENT CIRCUIT

IC601 BA336

IC701 AN6870



IC3 NJM4556D



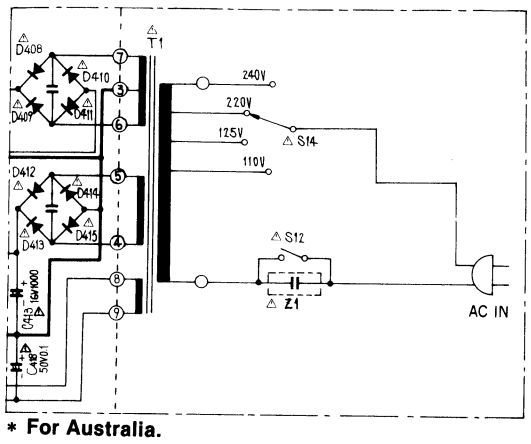
Q511 2SB641(R,S) [2SB641R] NA

IC701

	PLAYBACK	RECORD	STOP		PLAYBACK	RECORD	STOP
1	−10.71V	(−10.64V)	−10.74V	15	−10.55V	(−10.48V)	9.0V
2	−8.17V	(−8.1V)	−8.23V	16	〃	〃	〃
3	10.2V	(10.03V)	10.16V	17	10.56V	(−10.49V)	〃
4	−0.1V	(−0.1V)	−0.1V	18	〃	〃	〃
5	−0.1V	(−0.1V)	−0.1V	19	〃	〃	〃
6	−10.58V	(−10.5V)	9.0V	20	〃	〃	〃
7	〃	〃	〃	21	〃	〃	〃
8	〃	〃	〃	22	〃	〃	〃
9	〃	〃	〃	23	〃	〃	〃
10	〃	〃	〃	24	−7.29V	(−7.22V)	−7.4V
11	〃	〃	〃	25	4.79V	(4.63V)	3.4V
12	〃	〃	〃	26	−8.85V	(−8.8V)	−9.9V
13	〃	〃	〃	27	−8.85V	(−8.82V)	−1.3V
14	〃	〃	〃	28	−8.82V	(−8.78V)	−1.3V

Stop mode
9.42V
10.03V
10.13V

- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- All voltage values shown in circuitry are under no signal condition and volume control at minimum position. However, the voltage in record mode is indicated in ( ) when it differs from that in playback mode.
- The mark (▼) shows test point e.g. ▼ = Test point 1.
- ( ) indicates + B (bias).
- ( ) indicates + B (bias) at record mode.
- ( ) indicates the flow of the playback signal [TAPE 2].
- ( ) indicates the flow of the recording signal [TAPE 2].
- ( ) indicates the flow of the playback signal [TAPE 1].
- ( ) indicates the flow of the playback signal[TAPE 1]. (Dubbing/Mixing switch: OFF).



*** For Australia.**

- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.
  - **e.g. Q404**
    2SC1846(R,S)——Production parts number
    [2SC1846R]——Supply parts number
    D405, 416
    QVD1S2473——Production parts number
    [MA161]——Supply parts number
- D .....**For all European areas.**
- N .....**For Asia, Latin America, Middle East and Africa areas.**
- A .....**For Australia.**

NOTES: RESISTORS
- ERD ...Carbon
- ERG ...Metal-oxide
- ERS ...Metal-oxide
- ERO ...Metal-film
- ERX ...Metal-film
- ERQ ...Fuse type metallic
- ERC ...Solid
- ERF ...Cement

CAPACITORS
- ECBA .....Ceramic
- ECG□.....Ceramic
- ECK□.....Ceramic
- ECC□.....Ceramic
- ECF□.....Ceramic
- ECQM.....Polyester film
- ECQE .....Polyester film
- ECQF .....Polypropylene
- ECE□ .....Electrolytic
- ECE□N ...Non polar electrolytic
- ECQS .....Polystyrene
- ECS□.....Tantalum
- QCS .....Tantalum

REPLACEMENT PARTS LIST

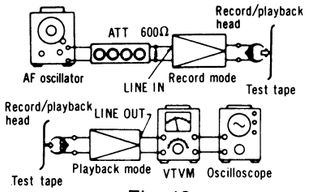
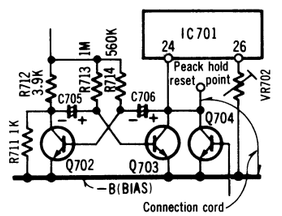
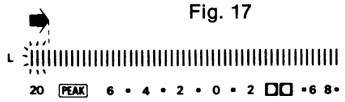
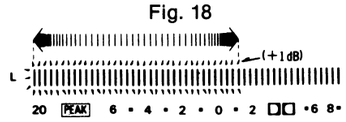
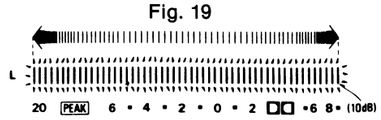
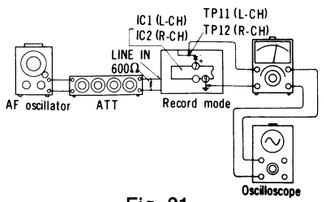
Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.
	RESISTORS	R213, 214	ERD25FJ472	R514	ERD25TJ683
		R215, 216	ERD25FJ103	R515	ERD25TJ104
R1, 2	ERD25FJ100			R516	ERD25TJ473
R3, 4	ERD25TJ224	R217, 218	ERD25FJ332	R517	ERD25TJ273
R5, 6	ERD25FJ101	R219, 220	ERD25TJ333	R518	ERD25TJ223
R7, 8	ERD25TJ823	R221, 222	ERD25FJ392	R519	ERD25TJ104
R9, 10	ERD25TJ393	R223, 224	ERD25FJ821	R520	ERD25FJ392
R11, 12	ERD25FJ330	R225, 226	ERD25FJ392	R521	ERD25FJ103
R13, 14	ERD25TJ224	R227, 228	ERD25FJ472	R522	ERD25FJ821
R15, 16	ERD25FJ472	R229, 230	ERD25TJ224	R523, 524	ERD25TJ563
R17, 18	ERD25FJ103	R231, 232	ERD25FJ272		
R19, 20	ERD25FJ332	R233, 234	ERD25TJ473	R525	ERD25FJ103
		R301, 302	ERD25TJ474	R526	ERD25TJ223
R21, 22, 23, 24				R527 NA	ERD25FJ272
	ERD25FJ472	R303, 304	ERD25TJ223		✱For Australia, Asia, Latin
R25, 26	ERD25FJ560	R305, 306	ERD25FJ472		America, Middle East and
R27, 28	ERD25TJ473	R307	ERD25FJ102		Africa areas.
R29, 30	ERD25FJ102	R308	ERD25FJ472	R528 NA	ERD25FJ103
R31, 32	ERD25TJ184	R309, 310	ERD25TJ473		✱For Australia, Asia, Latin
R33, 34	ERD25TJ823	R311	ERD25FJ472		America, Middle East and
R35, 36	ERD25FJ822	R312	ERD25TJ154		Africa areas.
R37, 38	ERD25FJ182	R313	ERD25TJ223	R529	ERD25FJ272
R39, 40	ERD25FJ272	R314	ERD25FJ101	R530	ERD25FJ103
R41, 42	ERD25FJ102	R315	ERD25TJ563	R531	ERD25FJ272
				R532	ERD25TJ223
R43, 44	ERD25TJ274	R316	ERD25TJ184	R533	ERD25FJ472
R45, 46	ERD25TJ105	R317	ERD25FJ152	R534	ERD25TJ153
R47, 48	ERD25TJ474	R318	ERD25FJ102		
R49, 50	ERD25TJ473	R319	ERD25FJ180	R535	ERD25TJ473
R51, 52	ERD25FJ332	R320	ERD25TJ394	R536	ERD25FJ182
R53, 54	ERD25FJ181	R321	ERD25FJ562	R537, 538	ERD25FJ562
R55, 56	ERD25TJ274	R322, 323, 324		R539	ERD25FJ101
R57, 58	ERD25TJ184		ERD25TJ563	R540, 541	ERD25TJ223
R59, 60	ERD25FJ181	R325	ERD25FJ102	R542	ERD25TJ473
R61, 62	ERD25FJ272	R326	ERD25FJ103	R543 NA	ERD25FJ103
		R401	ERD25FJ1R0		✱For Australia, Asia, Latin
R63, 64	ERD25FJ102	R402	ERD25FJ100		America, Middle East and
R65, 66	ERD25TJ224	R403, 404	ERD25FJ562		Africa areas.
R67, 68	ERD25TJ683	R405	ERD25FJ100	R601, 602, 603	
R69, 70	ERD25FJ822	R406 D	ERG1ANJ101		ERD25FJ562
R71, 72	ERD25FJ681		✱For all European areas.	R604	ERD25TJ154
R73, 74	ERD25FJ392	NA	ERD25FJ101	R605	ERD25TJ333
R75, 76, 77, 78			✱For Australia, Asia, Latin		
	ERD25TJ224		America, Middle East and	R606	ERD25FJ822
R79	ERD25FJ561		Africa areas.	R607	ERD25FJ391
R81, 82	ERD25FJ332	R407	ERD25FJ821	R701	ERD25TJ563
R83, 84	ERD25FJ122	R408	ERD25FJ471	R702	ERD25TJ153
		R409	ERD25FJ681	R703, 704	ERD25TJ683
R85, 86, 87, 88		R410	ERD25TJ563	R705, 706	ERD25TJ473
	ERD25FJ102	R411	ERD25TJ223	R707	ERD25TJ105
R89, 90	ERD25TJ104	R412	ERD25FJ821	R708	ERD25FJ103
R91, 92	ERD25TJ333			R709, 710	ERD25TJ105
R93, 94	ERD25TJ273	R413	ERD25FJ103	R711	ERD25FJ102
R95, 96	ERD25TJ124	R414	ERD25TJ563		
R97, 98	ERD25FJ102	R415	ERD25FJ121	R712	ERD25FJ392
R99 D	ERD25FJ470	R416	ERD25FJ101	R713	ERD25TJ105
	✱For all European areas.	R417	ERD25TJ104	R714	ERD25TJ564
NA	ERD25FJ270	R418	ERD25FJ561	R715 D	ERG1ANJ181
	✱For Australia, Asia, Latin	R419, 420			✱For all European areas.
	America, Middle East and	D⚠	ERX1ANJ3R9	NA	ERD25FJ181
	Africa areas.		✱For all European areas.		✱For Australia, Asia, Latin
R100 D	ERG2ANJ560	NA⚠	ERD25FJ3R9		America, Middle East and
	✱For all European areas.		✱For Australia, Asia, Latin		Africa areas.
NA	ERD25FJ560		America, Middle East and	R716, 717	
	✱For Australia, Asia, Latin		Africa areas.	D	ERX12ANJ271
	America, Middle East and	R421, 422	ERD25FJ681		✱For all European areas.
	Africa areas.	R501	ERD25TJ223	NA	ERD25FJ181
R101, 102	ERD25TJ474	R502	ERD25FJ472		✱For Australia, Asia, Latin
R103, 104	ERD25FJ122				America, Middle East and
		R503	ERD25TJ473		Africa areas.
R105, 106	ERD25FJ151	R504, 505	ERD25FJ562	R801, 802, 803, 804	
R109 D	ERD25FJ680	R506	ERD25FJ102		ERD25FJ103
	✱For all European areas.	R507	ERD25TJ473	R805	ERD25TJ333
R201, 202	ERD25TJ224	R508	ERD25FJ102	R806	ERD25FJ122
R203, 204	ERD25FJ101	R509	ERD25TJ273	R807	ERD25FJ272
R205, 206	ERD25TJ823	R510	ERD25TJ473	R808, 809	ERD25TJ563
R207, 208	ERD25TJ393	R511	ERD25FJ681		
R209, 210	ERD25TJ334	R512	ERD25FJ152		
R211, 212	ERD25FJ270	R513	ERD25TJ104		

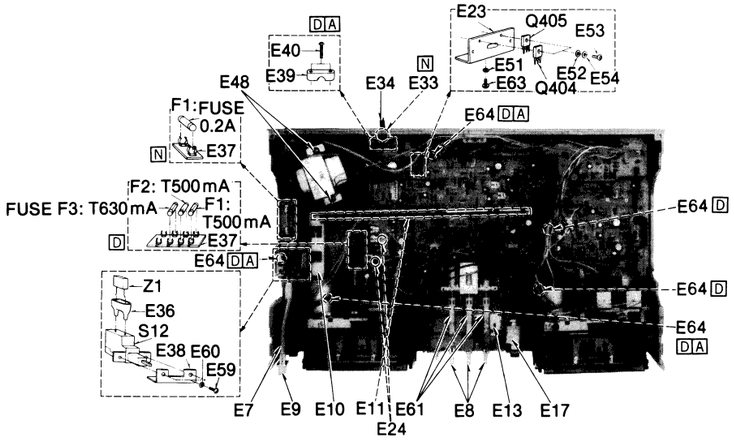
SPECIFICATIONS

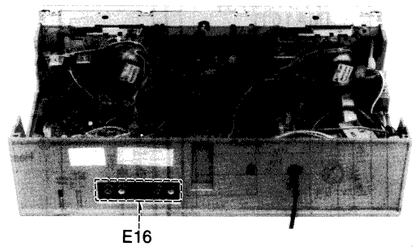
- ✱ Input level controls .....MAX
- ✱ Tape 1 level control ....."8" position

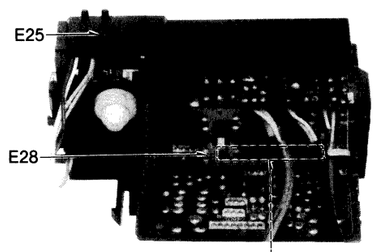
Playback S/N ratio Test tape ..... QZZCFM	Greater than 45dB
Overall distortion Test tape ... QZZCRA for Normal ... QZZCRX for CrO_2 ... QZZCRZ for Metal	Less than 4%
Overall S/N ratio Test tape ..... QZZCRA	Greater than 43dB (without NAB filter)

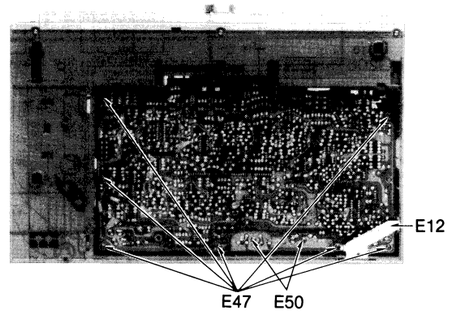
ITEM	MEASUREMENT & ADJUSTMENT
	10. Place UNIT into Metal tape mode change test tape to QZZCRZ. and record 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz, 12.5 kHz and 14 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 15). 11. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode. * Read voltage on VTVM and calculate bias current by following formula: Bias current (A) = Value read on VTVM (V) / 10 (Ω) around 400μA (Normal position) around 470μA (CrO_2 position) around 780μA (Metal position) } : measured at TP1 (L-CH) and TP2 (R-CH)
❹ Overall gain [TAPE 2] Condition: * Record/playback mode * Normal tape mode * Input level controls ··· MAX * Standard input level; MIC ····· −59.5±4 dB LINE IN ··· −24±4 dB Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω) * Test tape (reference blank tape) ···QZZCRA for Normal	1. Test equipment connection is shown in fig. 16. 2. Place UNIT into Normal tape mode, and load the test tape (QZZCRA). 3. Place UNIT into record mode. 4. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT to LINE IN. 5. Adjust ATT until monitor level at LINE OUT becomes 0.4 V. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.4 V. 7. If measured value is not 0.4 V, adjust VR3 (L-CH), VR4 (R-CH) 8. Repeat from step (2).  Fig. 16
❺ Fluorescent meter [TAPE 2] Condition: * Record mode * Input level controls ··· MAX Equipment: * VTVM * AF oscillator * ATT * Resistor (600Ω)	1. Test equipment connection is shown in fig. 17. 2. As shown in fig. 18, connecting the collector of Q703 and −B (bias) stops the oscillation of the astable multivibrator comprising Q702 and Q703. 3. Supply 1 kHz signal (−24 dB) to the LINE IN then press the record button. 4. Adjust the ATT so that the output level at LINE OUT becomes 0.4 V (The input level at this condition is termed the standard input level). 5. Adjustment at "−20 dB": A. Adjust the ATT so that the input level is −20 dB below standard recording level. B. Adjust VR701 so that the −20 dB segment lights up in the −20±0.8 dB range (L-CH only) (See fig. 18). 6. Adjustment at "0 dB": A. Adjust the ATT so that the output level at LINE OUT becomes 0.4 V. (The input level at this condition is termed the standard input level.) B. Adjust VR702 so that the +1 dB segment lights up in the 0±0.2 dB range of the standard input level (See fig. 19). 7. Repeat twice between steps (5) and (6) above. 8. Adjust ATT and check that all segments lights up when an input signal level is increased to 10 dB higher than the standard input level (See fig. 20).  Fig. 17  Fig. 18  Fig. 19  Fig. 20
❻ Dolby NR circuit [TAPE 2] Condition: * Record mode * Dolby NR switch ··· IN/OUT * Input level controls ··· MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω)	1. Test equipment connection is shown in fig. 21. 2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP11 (L-CH), TP12 (R-CH) (frequency 5 kHz). 3. Confirm that the value at IN position is 8 (±2.5) dB greater than the value at OUT position of Dolby NR switch.  Fig. 21

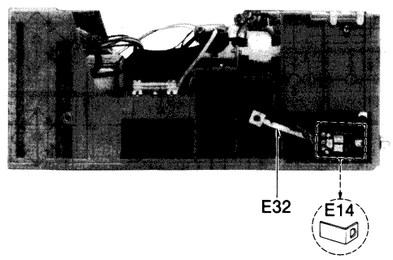
ELECTRICAL PARTS LOCATION

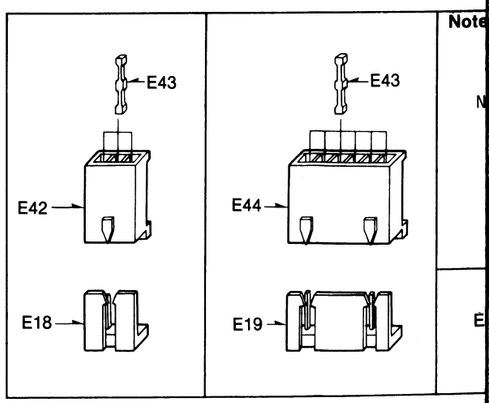


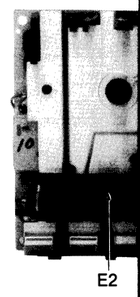


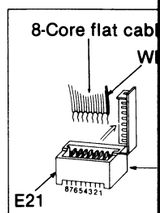


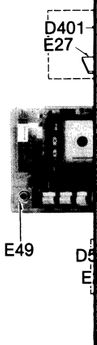




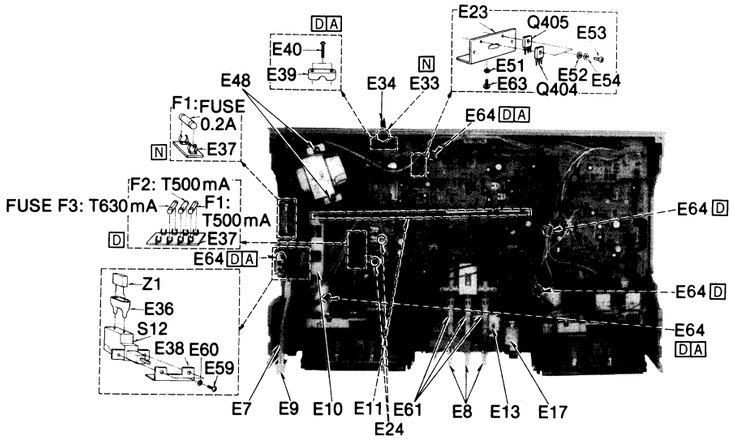


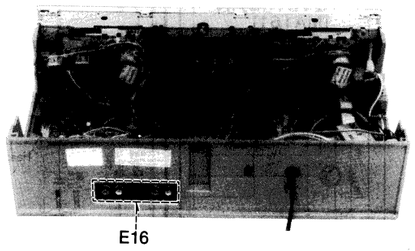


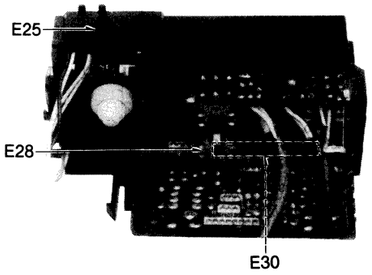


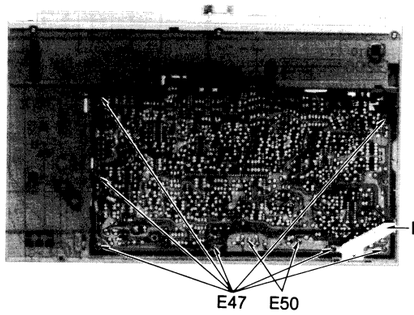


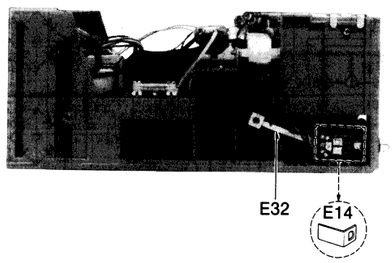
ELECTRICAL PARTS LOCATION

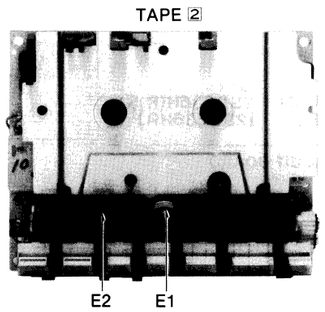


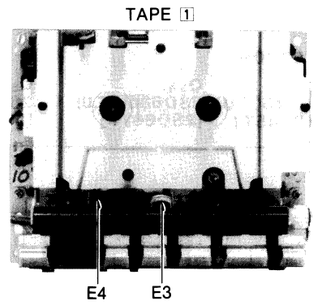


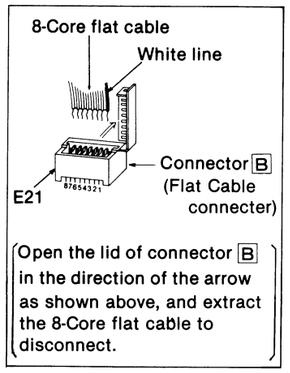


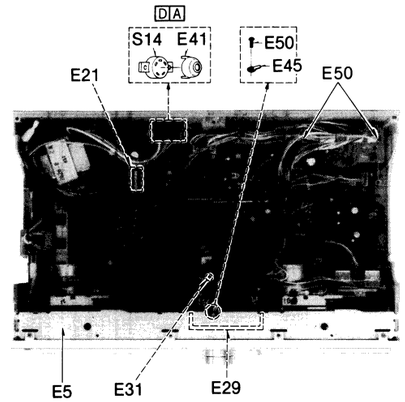


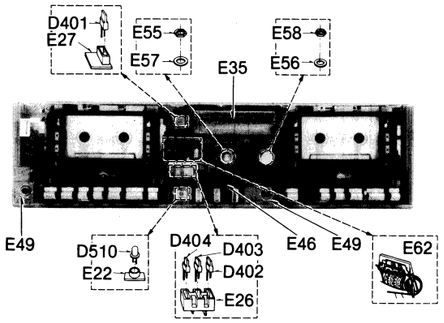




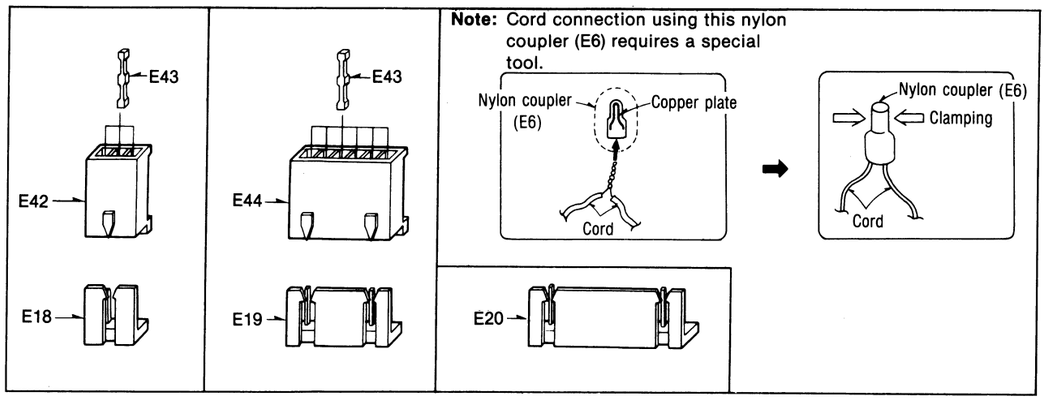



8-Core flat cable
White line
Connector B
(Flat Cable
connecter)
E21
Open the lid of connector B in the direction of the arrow as shown above, and extract the 8-Core flat cable to disconnect.





D ...For all European areas.
N ...For Asia, Latin America, Middle East and Africa areas.
A ...For Australia.



REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.		Part No.	Part Name & Description
		ELECTRICAL PARTS	
E1		QWY4123Z	Record/Playback Head
E2		QWY2138Z	Erase Head
E3		QWY4123Z	Record/Playback Head
E4		QWY2143Z	Erase Head
E5		QMA4223	Reinforcement Angle
E6		QJT1079	Nylon Coupler
E7		QMR1922	Power Switch Rod
E8		QGO1881S	Operation Switch Button
E9		QGO1879S	Power Switch Button
E10		QML3788	Record/Playback Lever
E11		QBS1135	Recording Wire
E12		QJC0040	Earth Plate-A
E13		QJC0041	Earth Plate-B
E14		QTW1267	Insulating Sheet
E16		QEJ5003	Pin Jack
E17		QTS1544	Shield Plate (MIC Jack)
E18		QJP1921TN	3 Pin Post
E19		QJP1922TN	6 Pin Post
E20		QJP1923TN	9 Pin Post
E21		QJS1983	Connector (for Flat Cable)
E22		QKJ0468	LED Holder
E23		QTH1158	Heat Sink
E24		QJT1041	Check Pin
E25		QMK1911	Center Chassis
E26		QKJ0467	LED Holder-A
E27		QKJ0469	LED Holder-C
E28		QTS1543	Shield Plate (for Control VR)
E29		QMA4257	Meter Angle
E30		QTW1265	Insulating Sheet
E31		QJT1067	Check Pin
E32		QJC0026	Earth Plate
E33	N	QTD1129	Cord Bushing
		✱For Asia, Latin America, Middle East and Africa areas.	
E34	D⚠	SJA88	AC Power Cord
		✱For all European areas.	
	N⚠	RJA52ZB-K	〃
		✱For Asia, Latin America, Middle East and Africa areas.	
	A⚠	SJAG23	〃
		✱For Australia.	
E35		QSLS006RF	FL Meter
E36	D	QTW1195	Spark Killer Cover
		✱For all European areas.	
	NA	QTW1118A	〃
		✱For Australia, Asia, Latin America, Middle East and Africa areas.	
E37	D⚠	QTF1039	Fuse Holder
		✱For all European areas.	
	N⚠	QTF1051	〃
		✱For Asia, Latin America, Middle East and Africa areas.	
E38		QMA4224	AC Power Switch Angle
E39	DA	QTD1164	Cord Clamper
		✱For all European areas and Australia.	
E40	DA	XTN3+16B	Screw ⊕3×16
		✱For all European areas and Australia.	
E41	DA	QTWM0026	Switch Cover
		✱For all European areas and Australia.	
E42		QJS1921TN	3 Pin Socket
E43		QJT1054	Contact
E44		QJS1922TN	6 Pin Socket
E45		QJT0015	Lug Terminal
E46		XTN26+6BFN	Screw ⊕2.6×6
E47		XTN3+12B	Screw ⊕3×12
E48		XTB4+14BFN	Screw ⊕4×14
E49		QNQ1070	Nut
E50		XTN3+10B	Screw ⊕3×10
E51		XWA3B	Washer
E52		XWG3B	〃
E53		XSN26+8	Screw ⊕2.6×8
E54		XWA26B	Washer
E55		QNQ1039	Nut
E56		QNQ1004	〃
E57		XWS9A	Washer
E58		XWS8A	〃
E59		XSN3+6S	Screw ⊕3×6
E60		XWA3B	Washer
E61		QMR1921	Operation Switch Rod
E62		QXC0070	Tape Counter
E63		XSN3+8S	Screw ⊕3×8
E64	DA	QTD1181	Nylon Binder
		✱For all European areas and Australia.	

13 12 11 10 9 8 7

Ref. No.	Part No.
R810 NA	ERD25TJ333
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
R811, 812, 813, 814	ERD25FJ103
R815 D	ERD25TJ153
✱For all European areas.	
R816 D	ERD25TJ183
✱For all European areas.	
VARIABLE RESISTORS	
VR1, 2	EVNM4AA00B24
VR3, 4	EVNM4AA00B54
VR201, 202	EVNM4AA00B24
VR203, 204	QWK8CAF25A24
VR301, 302	EWJS2AF21A24
VR401, 402	EVNM4AA00B15
VR701	EVNM4AA00B14
VR702	EVNM4AA00B24
CAPACITORS	
C1, 2	ECFDD102KVY
C3, 4	ECCD1H121KD
C5, 6	ECEA0JS471
C7, 8	ECQM1H273JZ
C9, 10	ECEA50Z3R3
C11, 12	ECEA1AS101
C13, 14	ECFDD153KVY
C15, 16	ECEA1AS221
C17, 18	ECKD1H223ZF
C19, 20	ECEA1HSR33
C21, 22	ECCD1H270KC
C23, 24	ECFDD102KVY
C25, 26	ECEA1AS470
C27, 28	ECEA1HN010
C29, 30	ECFDD102KVY
C31, 32	ECEA1HS100
C33, 34	ECFDD392KVY
C35, 36	ECQM1H472JZ
C37, 38	ECQM1H273JZ
C39, 40	ECEA1HS100
C41, 42	ECEA50ZR33
C43	ECQV05104JZ
C44	ECQM1H104KZ
C45, 46	ECQM1H562JZ
C47, 48	ECEA1HS100
C49, 50	ECFDD473KXY
C51, 52	ECKD1H223ZF
C53	ECEA1AS331
C54	ECEA0JS102
C55, 56	ECEA1HS100
C57, 58, 59, 60	ECEA50Z2R2
C61, 62	ECKD2H121KBL
C63, 64	ECEA50Z1
C65, 66	ECEA1HS100
C67, 68	ECFDD102KVY
C69, 70	ECQM1H333JZ
C71, 72	ECFDD682KVY
C73, 74	ECFDD183KXY
C75, 76	ECFDD473KXY
C77, 78	ECEA1HN010
C79	ECEA1AS470
C80	ECEA1AS221
C81, 82	ECEA25Z4R7
C83, 84	ECEA50Z1
C85	ECKD1H103ZF
C87, 88	ECFDD562KVY
C89, 90	ECKD1H103ZF
C201, 202	ECFDD102KVY
C203, 204	ECCD1H101KD
C205, 206	ECEA0JS471
C207, 208	ECQM1H273JZ
C209, 210	ECEA1AS101
C211, 212	ECEA50Z3R3
C213, 214	ECEA1AS470
C215, 216	ECKD1H223ZF
C217, 218	ECFDD153KVY
C301, 302, 303	ECEA50Z1
C304	ECKD1H103ZF
C305	ECCD1H151KD
C306	ECFDD102KVY
C307	ECEA25N4R7
C308	ECEA1AS101
C309	ECEA50Z1
C401 △	ECQP1183JZ
C402	ECEA1ES101
C403	ECFDD153KVY
C404	ECQM1H822KZ

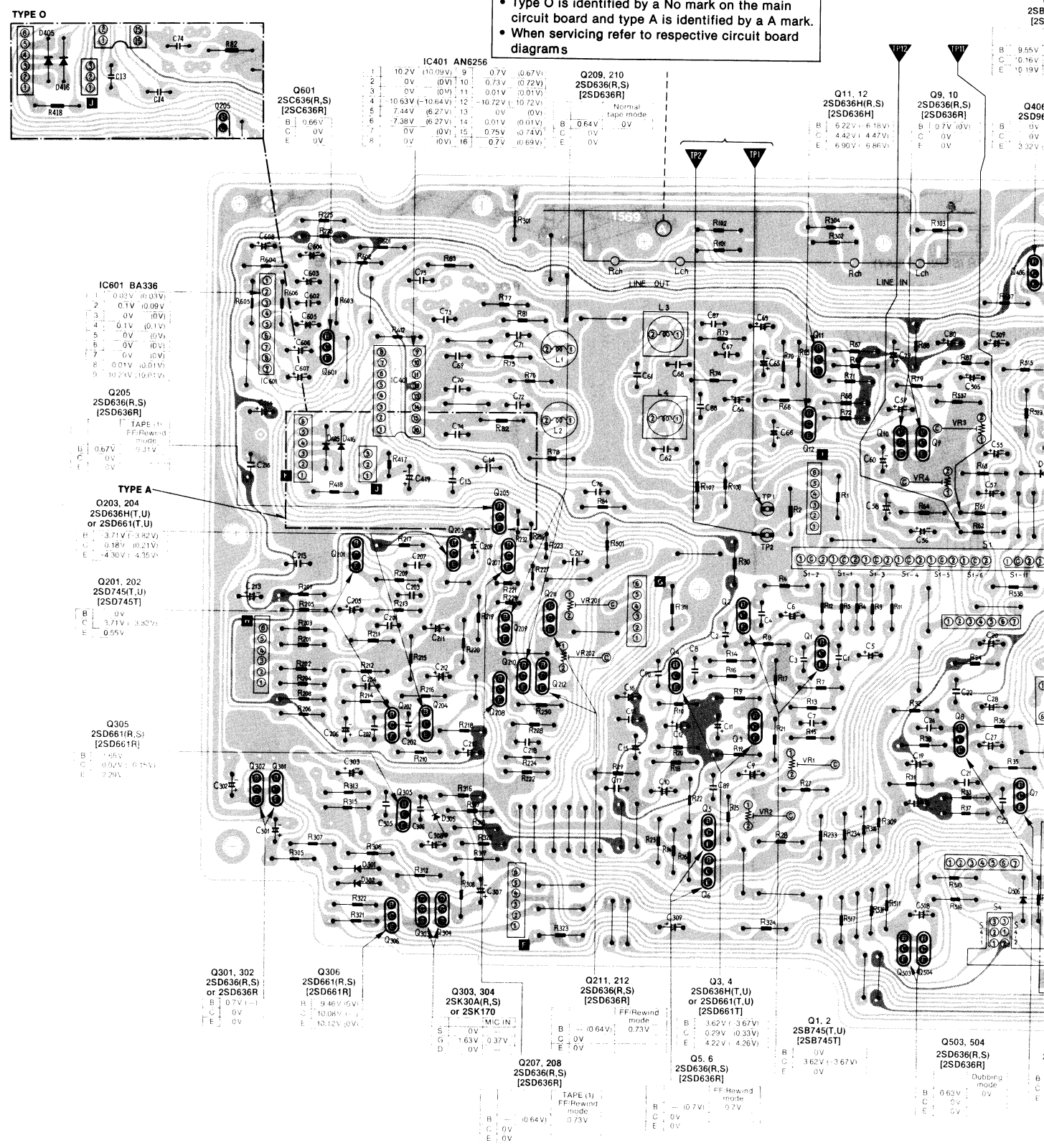
Ref. No.	Part No.
C405, 406	ECCD1H151KD
C407	ECKD1H223ZF
C408, 409	ECEA1CS331
C410	ECKD1H223ZF
C411, 412 △	ECEA1CS471
C413 △	ECEA1CS102
C417, 418 △	ECEA50ZR1
C419	ECEA1HS010
C501	ECEA1ES220
C502	ECEA50Z2R2
C503	ECEA1AS470
C504	ECEA25Z4R7
C505	ECEA1AS470
C506	ECEA1ES101
C507	ECEA1HS100
C508	ECEA50Z1
C509	ECEA50ZR47
C602	ECFDD102KVY
C603	ECEA50Z1
C604	ECEA50Z3R3
C605	ECEA50ZR22
C606	ECEA1HS100
C607	ECEA25Z4R7
C608	ECEA1CS330
C609	ECKD1H103ZF
C701, 702	ECEA50Z1
C703, 704	ECKD1H223ZF
C705	ECEA1HS100
C706	ECEA1HSR33
C707	ECFDD473MXY
C801	ECEA1CS102
C802	ECEA1CN100
SPARK KILLER	
Z1 D△	QCR0011B
✱For all European areas.	
NA△	QCR0008T
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
DIODES	
D1	MA161
D301, 302, 303, 304, 305	MA161
D401	TLR208
D402	SLB72YY5HL
D403	SLB72GG5HL
D404	SLB72UR5HL
D405	MA161
D406	SM112
D407	RVD1N4748
D408, 409, 410, 411, 412, 413, 414, 415 △	SM112
D416	MA161
D501, 502, 503, 504, 505, 506, 507, 508, 509	MA161
D510	TLG205
D511, 512	MA161
D513	SM112
D514	MA161
D701	MV121
D702, 703, 704, 705, 706	MA161
D707 NA	MA161
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
D708 NA	MA161
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
D801	SM112
D802, 803	MA161
D804	SM112
TRANSISTORS	
Q1, 2	2SB745T
Q3, 4	2SD661T
Q5, 6	2SD636R
Q7, 8	2SD636HR
Q9, 10	2SD636R
Q11, 12	2SD636HR
Q13, 14	2SC945-Q
Q201, 202	2SB745T
Q203, 204	2SD661T
Q205	2SD636R
Q207, 208, 209, 210, 211, 212	2SD636R

Ref. No.	Part No.
Q301, 302	2SD636(R,S)
Q303, 304	2SK30AO
Q305	2SD661R
Q306	2SB641R
Q401	2SD592NCS
Q402, 403	2SB641R
Q404	2SC1846R
Q405	2SA885Q
Q406	2SD965
Q501	2SB641R
Q502, 503, 504	2SD636R
Q505	2SB641R
Q506	2SD636R
Q507	2SB641R
Q508	2SD636R
Q509	2SB641R
Q510 NA	2SD636R
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
Q511 NA	2SB641R
✱For Australia, Asia, Latin America, Middle East and Africa areas.	
Q601	2SD636R
Q701, 702, 703, 704	2SD636R
Q801, 802	2SD636R
Q803	2SB641R
Q804, 805, 806	2SD636R
Q807	2SC1846R
INTEGRATED CIRCUITS	
IC1, 2	NE646B
IC3	NJM4556D
IC401	AN6256
IC601	BA336
IC701	AN6870

CIRCUIT BOARDS

MAIN CIRCUIT BOARD

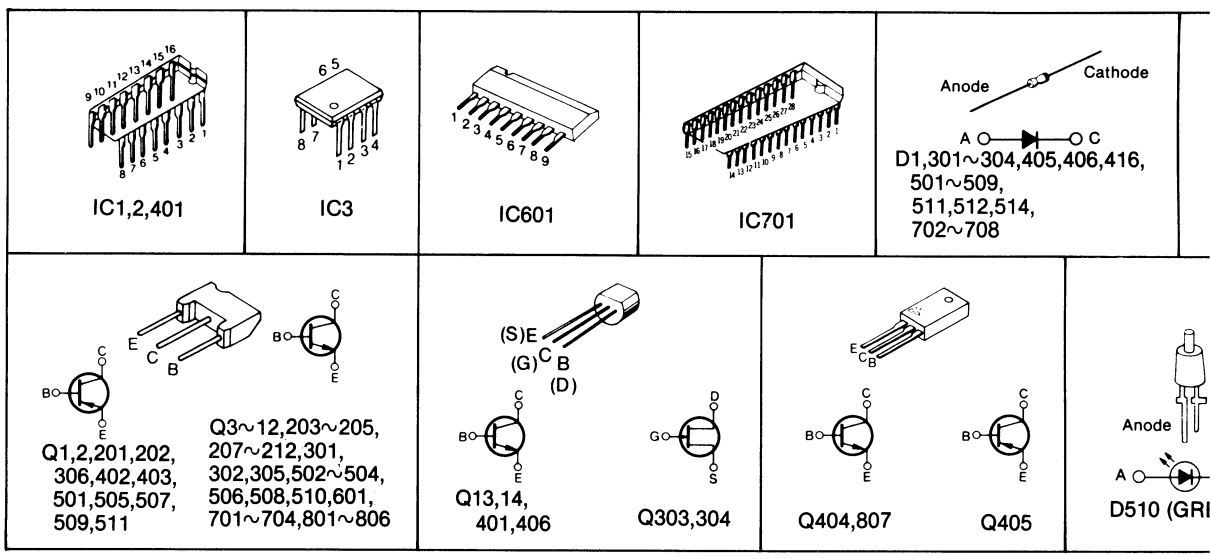
- This set is available with two types of printed circuit boards.
- Type O is identified by a No mark on the main circuit board and type A is identified by a A mark.
- When servicing refer to respective circuit board diagrams



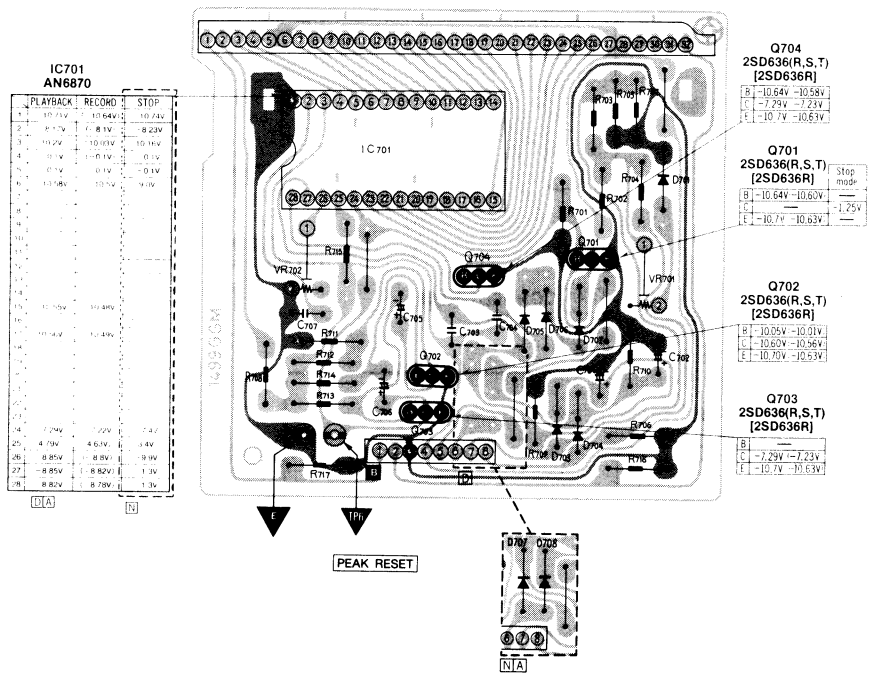
Ref. No.	Part No.	Part Name & Description
TRANSFORMER		
T1 D△	QLPD58ELC	AC Power Transformer
✱For all European areas.		
NA△	QLPN66ELC	〃
✱For Australia, Asia, Latin America, Middle East and Africa areas.		
COILS		
L1, 2	QLQX0332K	Peaking Coil
L3, 4	QLQX0343K	Bias Trap Coil
L401	QLB0198K	Bias Oscillation Coil
MPX1, 2	QLM9Z9K	MPX Filter Coil
FUSES		
F1 D△	XBAQ0003	Fuse (T 500mA)
✱For all European areas.		
NA△	XBA2E02NS5	Fuse (T 0.2A)
✱For Asia, Latin America, Middle East and Africa areas.		
F2 D△	XBAQ0003	Fuse (T 500mA)
✱For all European areas.		
F3 D△	XBAQ0008	Fuse (T 630mA)
✱For all European areas.		
SWITCHES		
S1	QSSC208TA	Slide Switch (Record/Playback Selector)

Ref. No.	Part No.	Part Name & Description
S2	QSWX308A	Push Switch (Dolby Switch)
S3	QSWX308A	Push Switch (Dubb./Mix. Switch)
S4	QSWX308A	Push Switch (Rec Mute Switch)
S5	QSB0251i	Leaf Switch (Playback Switch TAPE 2)
S6	QSB0251i	Leaf Switch (FF/REW Muting TAPE 2)
S7	QSB0251i	Leaf Switch (Playback Switch TAPE 1)
S8	QSB0251i	Leaf Switch (FF/REW Muting TAPE 1)
S9	QSB0251i	Leaf Switch (Auto Tape Select TAPE 1)
S10	QSB0253MU	Leaf Switch (Auto Tape Select TAPE 2)
S11	QSB0253MU	Leaf Switch (Auto Tape Select TAPE 2)
S12 △	QSW1117AS	Push Switch (Power ON/OFF)
S13	QSB0251i	Leaf Switch (Pause Switch TAPE 1)
S14 △	QSR1407H	Rotary Switch (AC Power Voltage Selector)
JACKS		
J1	QJA0258	Microphone Jack
J2	QJA0259	Headphones Jack

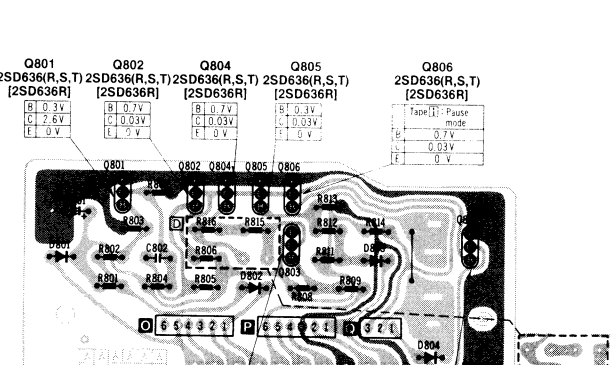
TERMINATIONS



FL METER CIRCUIT BOARD



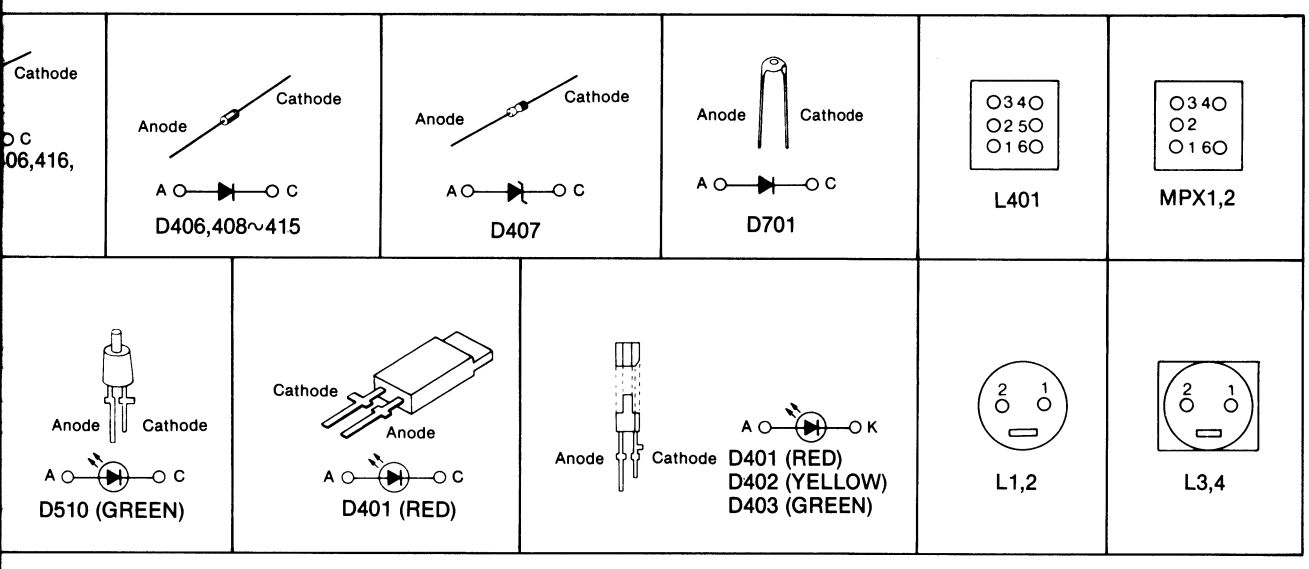
SERIES PLAY CONTROL CIRCUIT BOARD



[D].....For All European areas.
[N].....For Asia, Latin America, Middle East and Africa areas.
[A].....For Australia.

NOTES:

- The circuit shown in ▒ on the conductor is +B (bias) circuit.
- The circuit shown in ■ on the conductor is −B (bias) circuit.
- The circuit shown in ▒ on the conductor side indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ▭ are DC voltage between the ground and electrical parts.
- The voltage indicates are measured during playback mode.
- However, the voltage in playback mode is indicates in ( ) when it differs from that in record mode.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors. One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q1, 2
  2SB745(T,U)——Production parts number
  [2SB745T]——Supply parts number
- **The supply parts number is described alone in the replacement parts list.**



RS-M202

WIRING CONNECTION DIAGRAM

- This set is available with two types of printed circuit boards.
- Type O is identified by a No mark on the main circuit board and type A is identified by a A mark.
- When servicing refer to respective circuit board diagram and schematic diagram.

S11 ORG — BRN S10
LUG TERMINAL (To MECHANISM UNIT)
CONNECTOR J (TAPE 2)
S9: AUTO TAPE SELECTOR SWITCH (70μS) (TAPE 1)
(To MECHANISM UNIT)
LUG TERMINAL (To MECHANISM UNIT)
MOTOR
CONNECTOR O (TAPE 2)
S6: FF/REWIND SWITCH
S5: PLAYBACK SWITCH
S8: FF/REWIND SWITCH
CONNECTOR P (TAPE 1)
MOTOR
PLUNGER (MUSIC SELECTOR)
SERIES PLAY CONTROL CIRCUIT BOAI
PLUNGER
FL METER CI
AUTO TAPE SELECTOR LED CIRCUIT BOARD
D404 D403 D402
CONNECTOR K
MAIN CIRCUIT BOARD
TYPE A
PLAYBACK HEAD (TAPE 1)
CONNECTOR H
CONNECTOR C
CONNECTOR D
CONNECTOR E
HEAD CIRC
ERASE HEAD (TAPE 2)
MICROPHONE JACK CIRCUIT BOARD
TYPE O
CONNECTOR F
CONNECTOR G
CONNECTOR I
CONNECTOR N
INPUT LEVEL CONTROL CIRCUIT BOARD
TAPE 1 LEVEL CONTROL CIRCUIT BOARD
RECORD/PLAYBACK HEAD (TAPE 2)
DUBBING/MIXING LED CIRCUIT BOARD
D510
RECORD LED CIRCUIT BOARD
D401

NOTES:

BLK ..... Black
BLU ..... Blue
BRN ..... Brown
GRY ..... Gray
GRN ..... Green
L. BLU ... Light Blue
NIL ..... No Color Mark
ORG ..... Orange
PNK ..... Pink
RED ..... Red
SLD ..... Shield Wire
VLT ..... Violet
WHT ..... White
YEL ..... Yellow

E6: NYLON COUPLER
S14: AC VOLTAGE SELECTOR
AC POWER CORD
Z1: SPARK KILLER
S12: POWER ON/OFF SWITCH
T1: AC POWER TRANSFORMER
FUSE F3: T630mA
FUSE F2: T500mA
FUSE F1: T500mA
CONNECTOR A

* For all European areas.

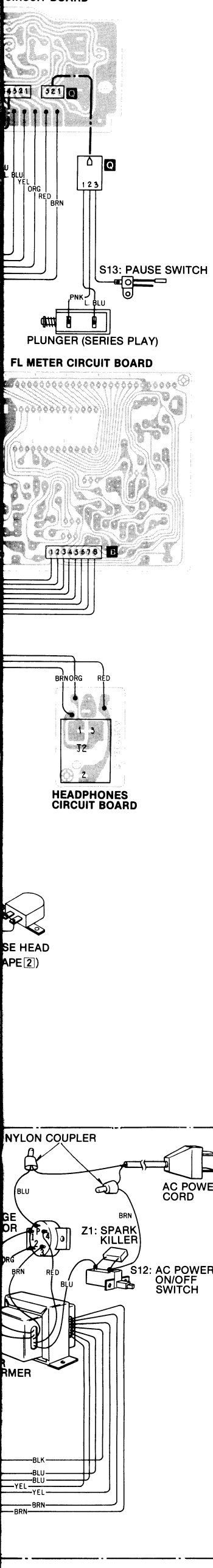
E6: NYLON COUPLER
S14: AC VOLTAGE SELECTOR
AC POWER CORD
Z1: SPARK KILLER
FUSE F1: T0.2A
S12: POWER ON/OFF SWITCH
T1: AC POWER TRANSFORMER
CONNECTOR A

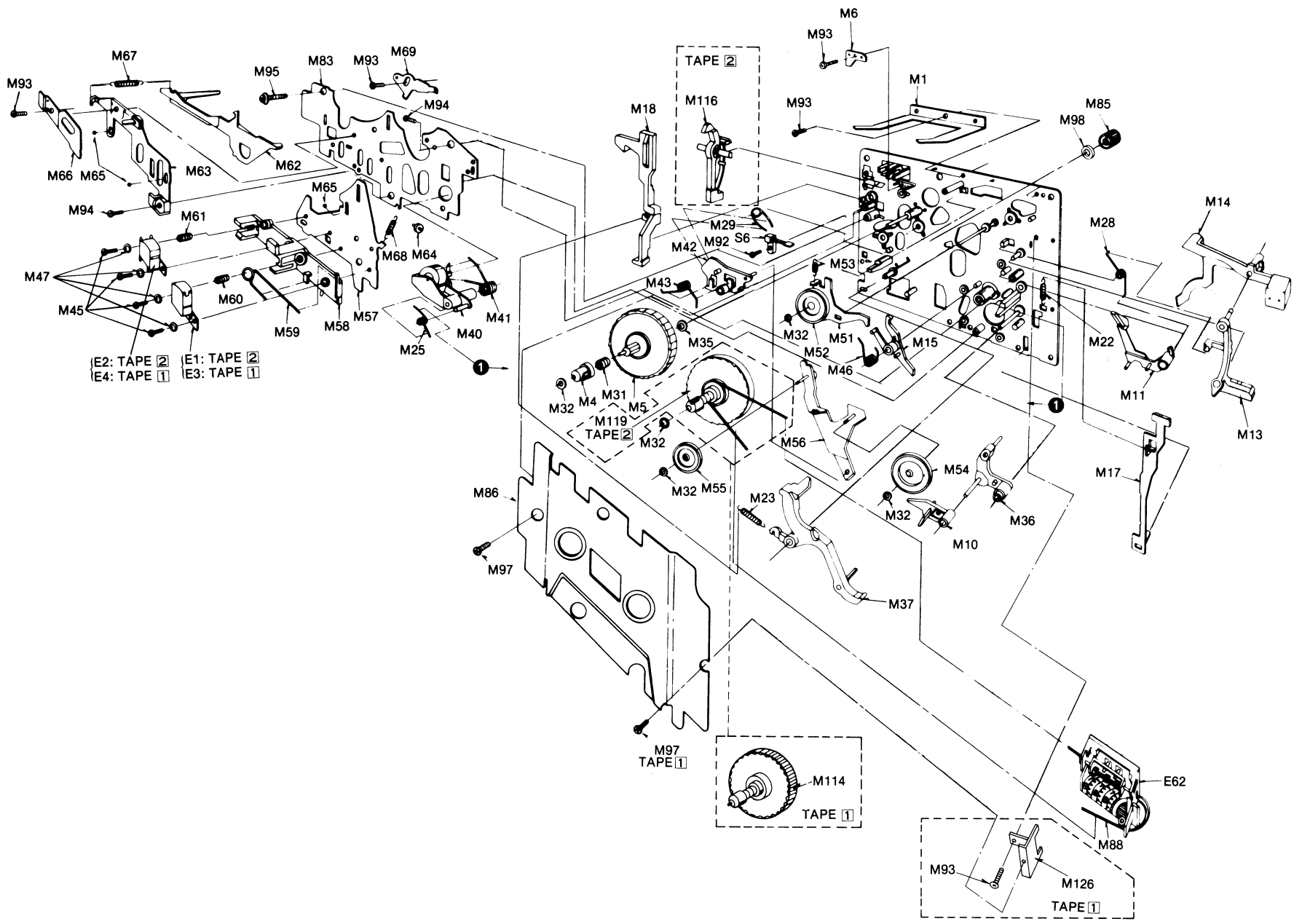
* For Asia, Latin America, Middle East and Africa areas.

E6: NYLON COUPLI
S14: AC VOLTAGE SELECTOR
T1: AC POWER TRANSFORMER
CONNECTOR A

* For Australia.

MECHANICAL PARTS LOCATION (FRONT SIDE)





SPECIFICATIONS

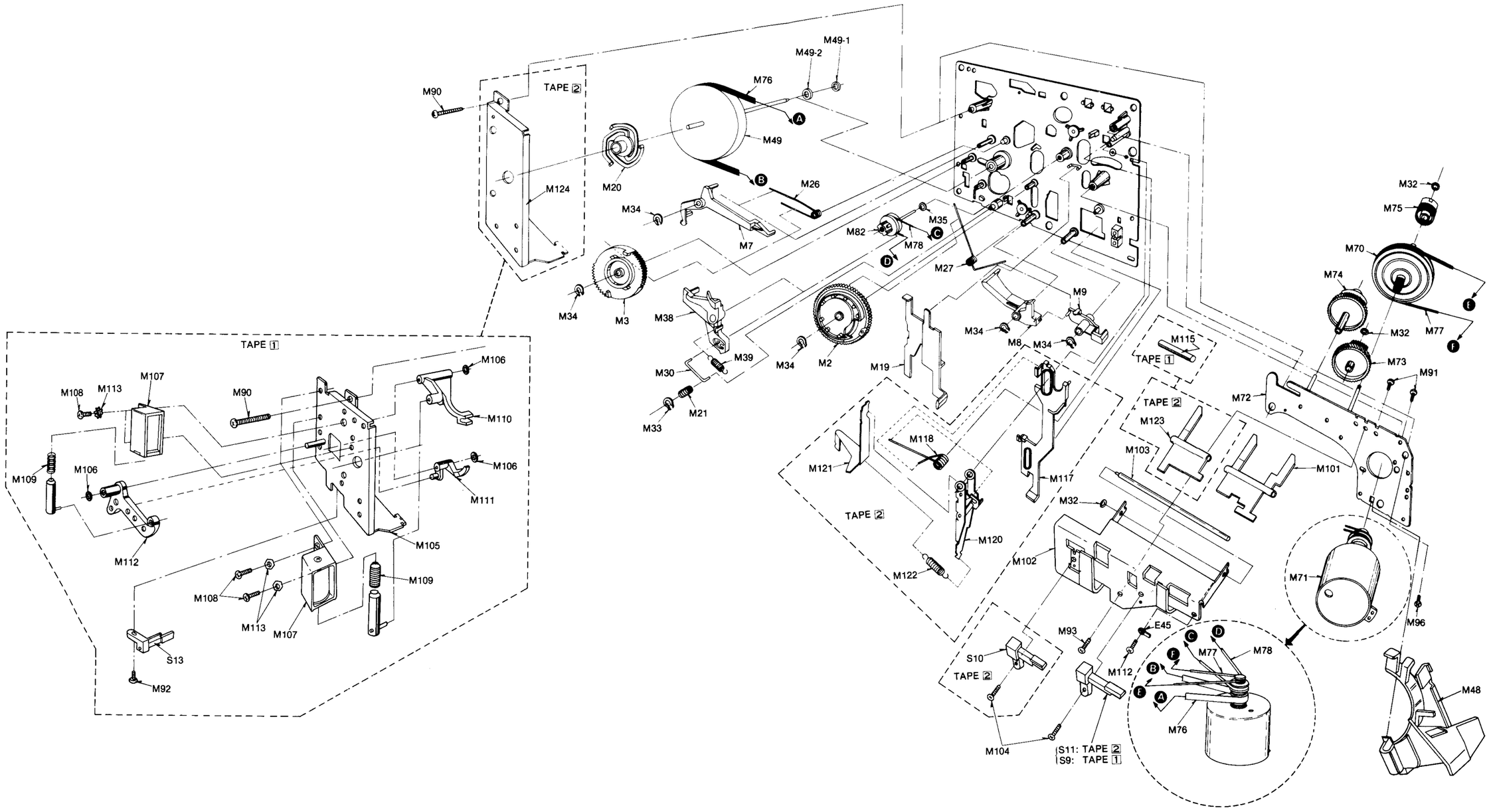
Pressure of pressure roller	350 ± 50 g
Takeup tension * Use cassette torque meter ··· QZZSRKCT	45^{+15}_{-10} g·cm
Wow and flutter; (JIS) * Use test tape ··· QZZCWAT	Less than 0.06% (WRMS)

- When servicing this mechanism unit, refer to the disassembly notes and assembly instructions described in the service manuals of RS-M51, RS-M13, RS-M14 and RS-M04 (RS-M24 mechanism series).
- Components identified by TAPE 1 in the mechanism parts location diagram are used only for mechanisms loaded with TAPE 1 (Playback deck), while components identified by TAPE 2 are used only for mechanisms loaded with TAPE 2 (Record/playback deck). Components without tape identification are common to both mechanisms.

REPLACEMENT PARTS LIST

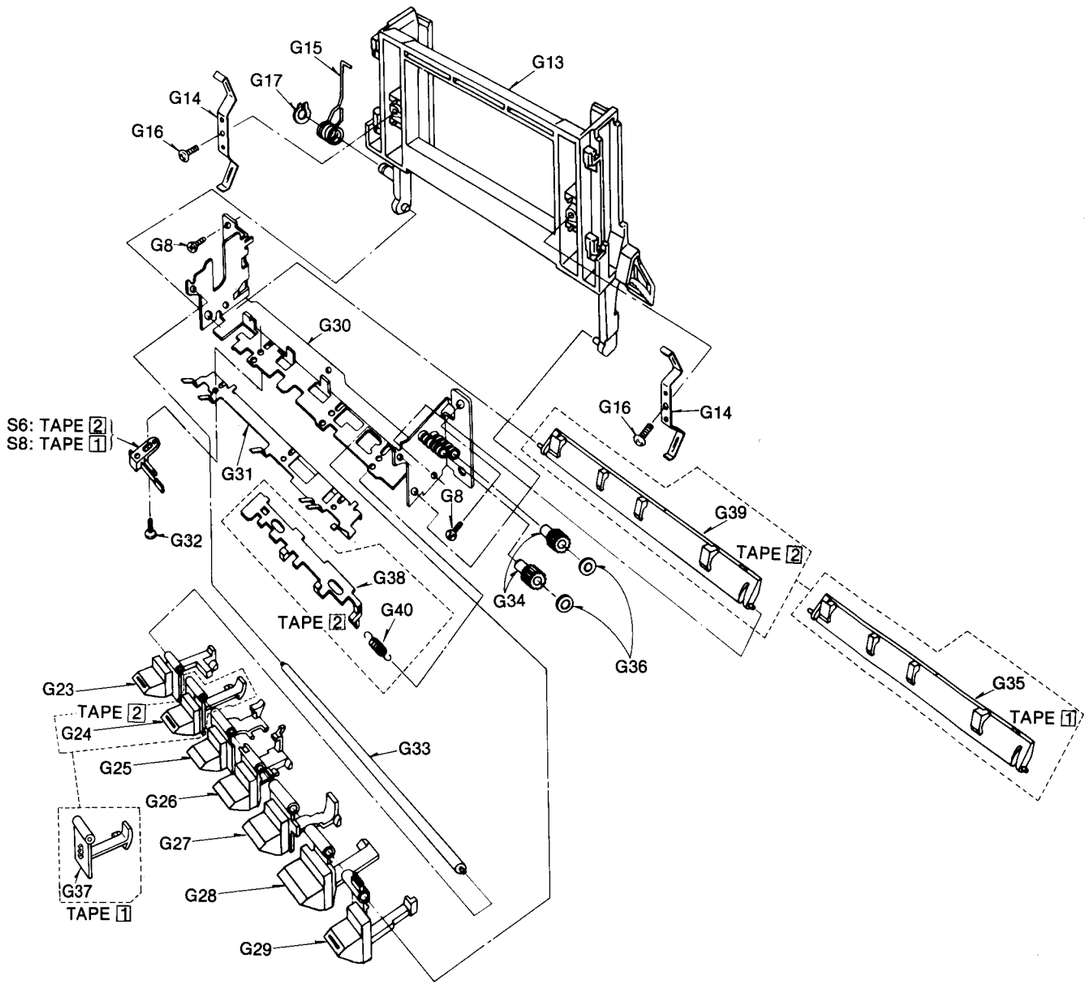
Ref. No.	Part No.	Part Name & Description
	MECHANICAL PARTS	
M1	QBP1874	Cassette Pressure Spring
M2	QDG1201	Main Gear
M3	QDG1202	Sub Gear
M4	QMB1336	Supply Reel Table Hub
M5	QDR1139	Supply Reel Table
M6	QMF2118	Fast Forward Arm Bracket
M7	QML3581	Sub Control Lever
M8	QML3583	Main Control Lever
M9	QML3584	Record Operation Lever
M10	QML3586	Head Base Plate Lift Lever
M11	QML3594	Auto-Stop Release Arm
M13	QML3604	Auto-Stop Driving Lever
M14	QML3605	Auto-Stop Detection Lever
M15	QML3592	Change Lever
M17	QMR1821	Auto-Stop Connection Rod
M18	QMR1822	Eject Rod
M19	QMR1824	Control Rod
M20	QMZ1239	Flywheel Thrust Retainer
M21	QBC1357	Lock Pin Pressure Spring
M22	QBT1682	Auto-Stop Connection Rod Spring
M23	QBT1894	Main Lever Spring
M25	QBN1742	Pressure Roller Release Spring
M26	QBN1744	Sub Gear Spring
M27	QBN1802	Main Gear Spring
M28	QBN1746	Auto-Stop Lever Spring
M29	QBN1747	Connection Spring
M30	QBS1128	Lock Pin
M31	QBC1372	Reel Table Spring
M32	QBW2008	Poly Washer
M33	XUB4FT	Stop Ring 4φ
M34	XUB3FT	Stop Ring 3φ
M35	QBW2012	Poly Washer
M36	QXL1354	Sub Lever Assembly
M37	QXL1355	Main Lever Assembly
M38	QML3582	Pause Lock Lever
M39	QBT1896	Lever Release Spring
M40	QXL1381	Pressure Roller Assembly
M41	QBN1743	Pressure Roller Spring
M42	QML3588	Fast Forward Lever
M43	QBN1748	Fast Forward Spring
M45	XSN2+10	Screw ⊕2×10
M46	QBN1741	Change Lever Spring
M47	XWG2	Washer 2φ
M48	QMZ1254	Cord Clamper
M49	QXF0164	Flywheel Assembly
M49-1	QBW2049	Poly Washer
M49-2	QBW2026	Snap Ring
M51	QXL1382	Idler Lever Assembly
M52	QXi0111	Takeup Idler Assembly
M53	QBT1893	Takeup Idler Spring
M54	QXi0113	Fast Forward Idler Assembly
M55	QXi0112	Rewind Idler Assembly
M56	QXL1383	Fast Forward Arm Assembly
M57	QMK1840	Head Base Plate
M58	QMZ1241	Head Spacer
M59	QBN1740	Head Pressure Spring
M60	QBC1278	Head Spring
M61	QBCA0008	〃
M62	QML3591	Brake Arm
M63	QMZ1240	Sub Head Base Plate
M64	QMN2550	Roller
M65	QDK1017	Steel Ball 2φ
M66	QBP1873	Head Base Plate Pressure Spring
M67	QBT1597	Brake Arm Spring
M68	QBT1892	Head Release Spring
M69	QMA3858	Head Adjustment Plate
M70	QXG1047	Takeup Gear Assembly
M71	QXU0170	Motor Assembly
M72	QXK2286	Sub Chassis Assembly
M73	QDG1199	Auto-Stop Gear
M74	QDG1200	Cam Gear
M75	QDP1823	Connection Pulley
M76	QDB0281	Capstan Belt
M77	QDB0274	Takeup Belt
M78	QDB0273	Fast Forward Belt
M82	QXP0607	Fast Forward Connection Pulley Assembly
M83	QMK1838	Upper Base Plate
M85	QDP1828	Fast Forward Pulley
M86	QXH0369	Chassis Cover Assembly
M88	QDB0218	Counter Belt

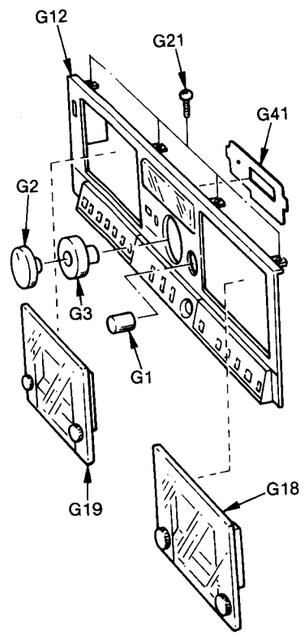
MECHANICAL PARTS LACATION (REAR SIDE)

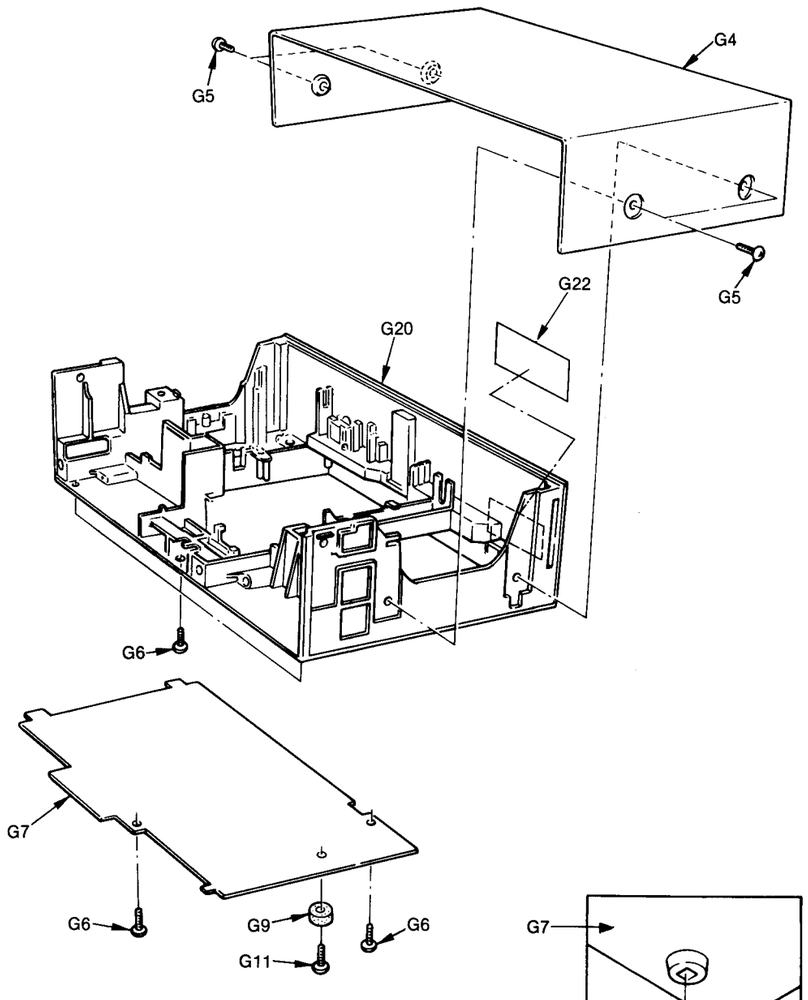


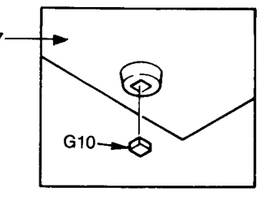
Ref. No.	Part No.	Part Name & Description
M90	XTN3+24B	Tapping Screw ⊕3×24
M91	XSN26+3	Screw ⊕2.6×3
M92	XTN2+6B	Tapping Screw ⊕2×6
M93	XTN26+6B	Tapping Screw ⊕2.6×6
M94	XTN26+10B	Tapping Screw ⊕2.6×10
M95	XTN26+12B	Tapping Screw ⊕2.6×12
M96	XTN3+10B	Tapping Screw ⊕3×10
M97	XTN26+6BFZ	Tapping Screw ⊕2.6×6
M98	QBW2085	Poly Washer
M101	QML3645	Tape Detection Lever-B (for Normal/CrO_2 Tape)
M102	QMA4228	Detection Lever Angle
M103	QMS2546	Detection Lever Shaft
M104	XSN2+5	Screw ⊕2×5
M105	QXA1178	Plunger Angle Assembly
M106	QBW2083	Snap Washer
M107	QMF0157	Plunger
M108	XSN3+6S	Screw ⊕3×6
M109	QBC1358	Plunger Spring
M110	QML3616	Lock Release Lever
M111	QML3801	Pause Release Lever
M112	QML3802	Pause Intermediate Lever
M113	XWC3B	Washer 3φ
M114	QXD0132	Takeup Reel Table Assembly
M115	QMC0136	Spacer
M116	QML3603	Erase Safety Lever
M117	QMR1820	Record Rod
M118	QBN1739	Selection Lever Spring
M119	QXD1143	Takeup Reel Table Assembly
M120	QXL1360	Record/Playback Selection Arm Assembly
M121	QML3580	Record/Playback Selection Lever
M122	QBT1895	Record/Playback Selection Lever Spring
M123	QML3644	Tape Detection Lever-A (for Metal Tape)
M124	QMA4063	Flywheel Retainer
M125	XTN26+4B	Screw ⊕2.6×4
M126	QMA4225	Chassis Cover Angle

CABINET PARTS LOCATION









REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
		CABINET PARTS
G1	QYT0624S	Volume Knob
G2	QYT0595	Volume Knob-A
G3	QYT0587	Volume Knob-B
G4	QGC1216W	Case Cover
G5	XTB4+10BFN	Screw ⊕4×10 (for Case Cover)
G6	XTN3+12B	Screw ⊕3×12 (for Bottom Cover)
G7	QGC1217	Bottom Cover
G8	XTN26+6B	Screw ⊕2.6×6
G9	QKA1083	Rubber Foot
G10	QKA1084	〃
G11	QHQ1313	Step Screw
G12	QYP1050	Front Panel Assembly
G13	QKF2092K	Cassette Holder
G14	QBP1923	Holder Spring
G15	QBN7010	Eject Spring
G16	XTN26+6BFZ	Screw ⊕2.6×6
G17	XUBQ5FT	Stop Ring
G18	QYF0506	Cassette Lid Assembly-A
G19	QYF0507	Cassette Lid Assembly-B
G20	QKM1482W	Main Chassis
G21	XTS3+6B	Screw ⊕3×6
G22 D	QGS2926	Main Name Plate
	✱For all European areas.	
N	QGS2925	〃
	✱For Asia, Latin America, Middle East and Africa areas.	
A	QGS2927	〃
	✱For Australia.	
G23	QXL1441	Eject Button Assembly
G24	QXL1442	Record Button Assembly
G25	QXL1443	Rewind Button Assembly
G26	QXL1444	Fast Forward Button Assembly
G27	QXL1445	Playback Button Assembly
G28	QXL1446	Stop Button Assembly
G29	QXL1447	Pause Button Assembly
G30	QXA1044	Operation Button Angle Assembly
G31	QBP1875	Operation Lever Spring
G32	XTN2+6B	Screw ⊕2×6
G33	QMN2554	Operation Lever Shaft
G34	QDG1102	Holder Gear
G35	QML3649	Lock Arm-B
G36	QBW2082	Snap Washer
G37	QML3601	Record Lever
G38	QMR1823	Obstruction Rod
G39	QML3593	Lock Arm
G40	QBT1597	Obstruction Rod Spring
G41	QGL1157	Meter Filter
		ACCESSORIES
A1	RP023A	Connection Cord
A2 D	QQT3103	Instruction Book
	✱For all European areas.	
N	QQT3088	〃
	✱For Asia, Latin America, Middle East and Africa areas.	
A	QQT3104	〃
	✱For Australia.	
A3 N⚠	QJP0603S	AC Plug Adaptor
	✱For Asia, Latin America, Middle East and Africa areas.	
		PACKINGS
P1	QPN4202	Inside Carton
P2	QPA0612	Cushion-A (Left Side)
P3	QPA0613	Cushion-B (Right Side)
P4	XZB50X65A02	Poly Bag (for UNIT)
P5	QPC0078	Sheet (for Pin Cord)
P6	QPC0072	Sheet (for AC Power Cord)
P7	QPS0434	Pad

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METHODES DES MEASURES ET REGLAGES

RS-M202 FRANCAIS

Ceci est à utiliser conjointement avec le manuel d'entretien du modèle No. RS-M202.

Sélecteur de bande (Réglage du mode de bande)
Pour ajuster la mesure avec les bandes d'essai sans trous de détection de bande (A et B), commuter les modes de bande de la façon suivante. (Pour le mode de bande normal il suffit d'insérer la bande dans le porte-cassette.)

- Réglage du mode pour bande métal:
  Le mode pour bande métal est obtenu en débranchant la douille à 3 broches [J] du montant à 3 broches [J] sur le P.C.B. (Plaguette à câblage imprimé).
  Réglage du mode pour bande CrO_2:
  D'abord débrancher la douille à 3 broches [J] de la même façon que ci-dessus. Ensuite comme c'est indiqué dans la figure à droite, brancher la bornel du montant à 3 broches à la terre avec un fil de branchement.

NOTA:

Pour garde: l'appareil en bon état de marche, positionner les commuteurs á levier et les commandes dans les positions suivantes, sauf indication contraire.

- Vérifiez que les têtes soiènt propres.
- Vérifiez que le cabestan e le galetpres-sure soient propres.
- Température ambiante admissible: 20±5°C. (68±9°F)
- Sélecteur de Dolby: OUT.
- Commutateur de test de crête: LINE.
- Commande de niveau: MAX.
- Commande de niveau de BANDE [1]: MAX.
- Sélecteur de surimpression/mixage: OFF

SECTION	MESURES ET REGLAGES
Ⓐ Réglage de la position de la tôte [BANDE [1] , BANDE [2]] Condition: * Le mode de lecture et pause	Il y a une plaque de réglage de la tête pour ajuster le contact de bande de la tête en mode de repérage avant ou arrière. 1. Appuyer sur le bouton de lecture (PLAY) et le bouton de pause. 2. Mesure l'espace qui sépare le galet presseur du cabestan. Valeur standard: 0,5 ± 0,3mm. 3. Si la valeur mesurée se trouve hors tolérances, desserrer la vis (A) et glisser la plaque de réglage de la tête dans la direction de ia flèche (B) pour effectuer le réglage.
Ⓑ Azimutage de tête [BANDE [1] , BANDE [2]] Condition: * Position lecture Equipement: * Voltmètre électronique * Oscilloscope * Bande étalon (azimutage)...QZZCFM	**Réglage de l'azimut de tête** Réglage de l'équilibre de la sortie de canal gauche/canal droit 1. Effectuer les connexions comme indiqué dans la Fig. 3. 2. Reproduire le signal de 8kHz de la bande d'essai (QZZCFM). Régler la vis (B) dans la Fig. 4 pour obtenir les niveaux de sortie maximum pour les canaux gauche et droit. Lorsque les niveaux de sortie des canaux gauche et droit ne sont pas simultanément à leur maximum, les re-régler de la façon suivante. 3. Faire tourner la vis indiquée dans la Fig. 4 pour trouver les angles A et C (point où les niveaux de sortie de crête pour les canaux gauche et droit sont obtenus respectivement). Situer alors l'angle B entre les angles A et C, autrement dit, en un point où les niveaux de sortie des canaux gauche et droit atteignent tous deux leur maximum. (Voir les Fig. 4 et 5.) **Réglage de phase canal gauche/canal droit** 4. Effectuer les connexions comme indiqué dans la Fig. 6. 5. Reproduire le signal de 8kHz de la bande d'essai (QZZCFM). Régler la vis (B) indiquée dans la Fig. 4 de sorte que les ai uilles des deux voltmètres électroniques oscillent au maximum, et qu'on obtienne sur l'oscilloscope une forme d'onde semblable à celle indiquée dans la Fig. 7.
Ⓒ Vitesse de défilement [BANDE [1] , BANDE [2]] Condition: * Position lecture Equipement: * Compteur électronique numérique ou fréquencemètre numérique * Bande étalon...QZZCWAT	**Précision de la vitesse de défilement** 1. Branchez les appareils comme ci-dessous. (Voir Fig. 8). 2. Lire la bande étalon (OZZCWAT, 3000Hz) dans la section centrale, et appliquer le signal de sortie au fréquencemètre. 3. Effectuez la mesure sur la partie médiane de la bande. 4. Mesurez sa fréquence. 5. Sur la base de 3000Hz, déteminez la valeur à l'aide de la formule. Précision de vitesse = $\frac{f-3000}{3000}$ x 100 (%) avec f = valeur mesurée **Valeur standard:** **BANDE [1] (Appareil de lecture)** **+1,83% ~ −1,16%** **BANDE [2] (Appereil d'enregistrement/lecture)** **+1,33% ~ −1,67%** **Méthode de réglage** 1. Lisez la bande étalon (milieu). 2,3. Ajustez la vis de réglage de vitesse VR indiquée Fig. 1 pour que la fréquence devienne égale à 3000Hz.

SECTION	MESURES ET REGLAGES
	Eluctuations de vitesse de défilement Faites les mesures de la même facon que ci-dessus (au début, au milieu et en fin dè bande) et déterminez la différence entre les valeurs maximale et minimale, puis calculez comme suit. Fluctuations de vitesse = $\frac{f_1-f_2}{3000}$ x 100 (%) f_1 = valeur maximale f_2 = valeur minimale **Valeur normale: monis de 1%** **Nota:** Utiliser un tournevis non métallique pour régler la vitesse de bande de cet appareil avec précision.
Ⓓ Réponse en fréquence à la lecture [BANDE [1] , BANDE [2]] Condition: * Position lecture * Mode pour bande normal * Commande de niveau de BANDE [1] ...MAX. Equipement: * Voltmètre électronique * Oscilloscope * Bande étalon...QZZCFM	1. Branchez les appareils de mesure comme pour "l'azimutage de tête", mais en utilisant la bande étalon (QZZCFM) au lies de la bande étalon d'azimutage (Voir Fig. 3). 2. Placez l'appareil en Mode pour bande normal. 3. Lisez la bande étalon de courbe de réponse (QZZCFM). 4. Mesurez les niveaux de sortie à 315Hz, 12,5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz et 63Hz et comparez chaque niveau de sortie avec celui de la fréquence étalon de 315Hz, sur la borne LINE OUT. 5. Effectuez la mesure sur les deux canaux. 6. Vérifiez que les valeurs mesurées se situent à l'intérieur du gabarit de courbe de réponse. (Vori Fig. 9).
Ⓔ Gain à la lecture [BANDE [1] , BANDE [2]] Condition: * Position lecture * Mode pour bande normal * Commande de niveau de BANDE [1]...MAX. Equipement: * Voltmètre électronique * Oscilloscope * Bande étalon...QZZCFM	1. Branchez les appareils comme ci-dessous. (Voir Fig. 3) 2. Lisez la partie "niveau standard" de la bande étalon (QZZCFM, 315Hz, 0V) et mesurez le niveau de sortie, avec le voltmètre électronique, sur le jack LINE OUT. 3. Effectuez les mesures sur les deux canaux. **Valeur standard: BANDE [1]: 0,59V ± 1dB** **BANDE [2]: 0,38V ± 1dB** **Réglage** 1. Si la valeur mesurée ne correspond pas à la valeur standard, régler VR201 (BANDE 1 : canal gauche), VR202 (BANDE 1 : canal droit), VR1 (BANDE 2 : canal gauche), VR2 (BANDE 2 : canal droit). 2. Après réglage, vérifier à nouveau "La réponse en fréquence à la lecture".
Ⓕ Courant d'effacement [BANDE [2]] Condition: * Position enregistrement * Mode pour bande Metal Equipement: * Voltmètre électronique * Oscilloscope	1. Branchez les appareils comme ci-dessous (Voir Fig. 10). 2. Placez l'appareil en Mode pour bande Metal 3. Appuyez sur les boutons d'enlegistrement et de pause. 4. Déterminer le courant d'effacement avec la formule suivante. Courant d'effacement (A) = $\frac{\text{Tension aux bornes de la résistance R401 (V)}}{1\ (\Omega)}$ **Valeur normale: 160 $^{+10}_{-20}$ mA (position Metal)** 5. Si la valeur mesurée ne correspond pas à la norme, réglez de la maniére suivante. **Réglage** 1. Ouvrir le point (A) et court-circuiter le point (B) sur la plaquette de circuit principale dans le schéma de câblage. (Voir page 10) 2. Mesurer la valeur du courant d'effacement. 3. S'assurer que la valeur mesurée se trouve entre 140 mA et 170 mA. 4. Si elle se situe au-delà de la valeur, proéder aux réglages suivants. • Si le courant d'effacement est inférieur à 140 mA, courtcircuiter le point (A). • Si le courant d'effacement est supérieur à 170 mA, ouvrir le point (A) et le point (B).

SECTION	MESURES ET REGLAG
Ⓖ Courbe de réponse globale [BANDE [2]] Condition: * Positions enregistrement/ lecture * Mode pour bande normal * Mode pour bande CrO_2 * Mode pour bande Metal * Commande de niveau ...MAX. Equipement: * Voltmètre électronique * Générateur AF * Atténuateur * Oscilloscope * Bande étalon vierge ...QZZCRA pour type Normal ...QZZCRX pour CrO_2 ...QZZCRZ pour Metal * Resistance (600Ω)	**Nota** Avant de mesurer et régler, vérifiez que la courbe correct (pour la méthode de mesure, reportez-vou **Réglage de la réponse de fréquence globale par l' polarisation** (• L'egaliseur d'enregistrement est fixe.) 1. Effectuer les connexions comme indiqué dans 2. Placez l'appareil en Mode pour bande normal (QZZCRA). 3. Mettre en entrée un signal de 1kHz, −24dB p Placer l'appareil sur le mode Enregistrement. 4. Effectuer un réglage fin de l'atténuateur pour OUT de 0,4V. S'assurer que le signal d'entrée est bien de − de sortie de 0,4V. 5. Régler l'atténuateur pour réduire de 20dB le n 6. Régler l'oscillateur de fréquence audio pour p 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10k signaux sur la bande d'essai. 7. Reproduire les signaux enregistrés dans la ph de réponse de fréquence est comprise dans l de réponse de fréquence globale pour bandes la courbe est comprise dans les spécification et 11). Si la courbe ne correspond pas aux spécifica comme suit. Réglage Ⓐ : Lorsque la courbe dépasse les spécifications du tableau de réponse de fréquence globale (Fig. 11), comme indiqué dans la Fig. 13. 1) Augmenter le courant de polarisation en tournant VR401 (canal gauche) et VR 402 (canal droit). (Voir Fig.1) 2) Répéter les phases 6 et 7 pour confirmer. (Passer aux phases 8, 9, 10 et 11 si la courbe est maintenant comprise dans les spécifications du tableau de la Fig. 11). 3) Si la courbe dépasse encore les spécifications (Fig. 11), augmenter encore le courant de polarisation et répéter les phases 6 et 7. Réglage Lorsque dessous du table globale indiqué 1) Réduir polaris VR401 (canal 2) Répét pour c aux ph si la c mainte les sp tablea 3) Si la c au-des spécif (Fig. 1 courat répéte 8. Placez l'appareil en Mode pour bande CrO_2. 9. Changer la bande d'essai pour QZZCRX, et e 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8k Reproduire ensuite ces signaux et vérifier si le tableau de réponse de fréquence globale p 10. Placez l'appareil en Mode pour bande Metal, pour QZZCRZ, et enregistrer des signaux de 1kHz, 4kHz, 8kHz, 10kHz, et 12,5kHz. Repro vérifier si la courbe est comprise dans le tab globale pour les bandes Métal (Fig. 15) 11. Confirmer que les courants de polarisation s suivants lorque le sélecteur de bande est mi * Lisez la tension sur le voltmètre électronique e prémagétisation selon la formule. Courant de prémagnétisation (A) = $\frac{\text{Tension lue sur voltm. élec. (V)}}{10\ (\Omega)}$

MESURES ET REGLAGES
Eluctuations de vitesse de défilement Faites les mesures de la même facon que ci-dessus (au début, au milieu et en fin dè bande) et déterminez la différence entre les valeurs maximale et minimale, puis calculez comme suit. Fluctuations de vitesse = $\frac{f_1 - f_2}{3000}$ x 100 (%) f_1 = valeur maximale f_2 = valeur minimale **Valeur normale: monis de 1%**
Nota: Utiliser un tournevis non métallique pour régler la vitesse de bande de cet appareil avec précision.
1. Branchez les appareils de mesure comme pour "l'azimutage de tête", mais en utilisant la bande étalon (QZZCFM) au lies de la bande étalon d'azimutage (Voir Fig. 3). 2. Placez l'appareil en Mode pour bande normal. 3. Lisez la bande étalon de courbe de réponse (QZZCFM). 4. Mesurez les niveaux de sortie à 315Hz, 12,5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz et 63Hz et comparez chaque niveau de sortie avec celui de la fréquence étalon de 315Hz, sur la borne LINE OUT. 5. Effectuez la mesure sur les deux canaux. 6. Vérifiez que les valeurs mesurées se situent à l'intérieur du gabarit de courbe de réponse. (Vori Fig. 9).
1. Branchez les appareils comme ci-dessous. (Voir Fig. 3) 2. Lisez la partie "niveau standard" de la bande étalon (QZZCFM, 315Hz, 0V) et mesurez le niveau de sortie, avec le voltmètre électronique, sur le jack LINE OUT. 3. Effectuez les mesures sur les deux canaux. **Valeur standard: BANDE 1: 0,59V ± 1dB** **BANDE 2: 0,38V ± 1dB** **Réglage** 1. Si la valeur mesurée ne correspond pas à la valeur standard, régler VR201 (BANDE 1 : canal gauche), VR202 (BANDE 1 : canal droit), VR1 (BANDE 2 : canal gauche), VR2 (BANDE 2 : canal droit). 2. Après réglage, vérifier à nouveau "La réponse en fréquence à la lecture".
1. Branchez les appareils comme ci-dessous (Voir Fig. 10). 2. Placez l'appareil en Mode pour bande Metal 3. Appuyez sur les boutons d'enlegistrement et de pause. 4. Déterminer le courant d'effacement avec la formule suivante. Courant d'effacement (A) = $\frac{\text{Tension aux bornes de la résistance R401 (V)}}{1\ (\Omega)}$ **Valeur normale: 160 $^{+10}_{-20}$ mA (position Metal)** 5. Si la valeur mesurée ne correspond pas à la norme, réglez de la maniére suivante. **Réglage** . Ouvrir le point (A) et court-circuiter le point (B) sur la plaquette de circuit principale dans le schéma de câblage. (Voir page 10) . Mesurer la valeur du courant d'effacement. . S'assurer que la valeur mesurée se trouve entre 140 mA et 170 mA. . Si elle se situe au-delà de la valeur, proéder aux réglages suivants. • Si le courant d'effacement est inférieur à 140 mA, courtcircuiter le point (A). • Si le courant d'effacement est supérieur à 170 mA, ouvrir le point (A) et le point (B).

SECTION	MESURES ET REGLAGES
G Courbe de réponse globale [BANDE 2] Condition: * Positions enregistrement/lecture * Mode pour bande normal * Mode pour bande CrO_2 * Mode pour bande Metal * Commande de niveau ...MAX. Equipement: * Voltmètre électronique * Générateur AF * Atténuateur * Oscilloscope * Bande étalon vierge ...QZZCRA pour type Normal ...QZZCRX pour CrO_2 ...QZZCRZ pour Metal * Resistance (600Ω)	**Nota** Avant de mesurer et régler, vérifiez que la courbe de réponse en lecture est correct (pour la méthode de mesure, reportez-vous au paragraph considéré). **Réglage de la réponse de fréquence globale par l'enregistrement du courant de polarisation** (• L'egaliseur d'enregistrement est fixe.) 1. Effectuer les connexions comme indiqué dans la Fig. 12. 2. Placez l'appareil en Mode pour bande normal, et charger la bande d'essai (QZZCRA). 3. Mettre en entrée un signal de 1kHz, −24dB par l'intermédiaire de LINE IN. Placer l'appareil sur le mode Enregistrement. 4. Effectuer un réglage fin de l'atténuateur pour obtenir une sortie de LINE OUT de 0,4V. S'assurer que le signal d'entrée est bien de −24dB ± 4dB avec une tension de sortie de 0,4V. 5. Régler l'atténuateur pour réduire de 20dB le niveau du signal d'entrée. 6. Régler l'oscillateur de fréquence audio pour produire des signaux de 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz et enregistre ces signaux sur la bande d'essai. 7. Reproduire les signaux enregistrés dans la phase 6, et vérifier si la courbe de réponse de fréquence est comprise dans les spécifications du tableau de réponse de fréquence globale pour bandes normales, dans la Fig. 11. (Si la courbe est comprise dans les spécifications, passer aux phases 8, 9, 10 et 11). Si la courbe ne correspond pas aux spécifications du tableau, régler comme suit. Réglage A : Lorsque la courbe dépasse les spécifications du tableau de réponse de fréquence globale (Fig. 11), comme indiqué dans la Fig. 13. 1) Augmenter le courant de polarisation en tournant VR401 (canal gauche) et VR 402 (canal droit). (Voir Fig.1) 2) Répéter les phases 6 et 7 pour confirmer. (Passer aux phases 8, 9, 10 et 11 si la courbe est maintenant comprise dans les spécifications du tableau de la Fig. 11). 3) Si la courbe dépasse encore les spécifications (Fig. 11), augmenter encore le courant de polarisation et répéter les phases 6 et 7. Réglage B : Lorsque la courbe tombe au-dessous des spécifications du tableau de fréquence globale (Fig. 11), comme indiqué dans la Fig. 14. 1) Réduire le courant de polarisation en tournant VR401 (canal gauche) et VR402 (canal droit). 2) Répéter les phases 6 et 7 pour confirmer. (Passer aux phases 8, 9, 10 et 11 si la courbe est maintenant comprise dans les spécifications du tableau de la Fig. 11). 3) Si la courbe tombe encore au-dessous des spécifications du tableau (Fig. 11), réduire encore le courant de polarisation et répéter les phases 6 et 7. 8. Placez l'appareil en Mode pour bande CrO_2. 9. Changer la bande d'essai pour QZZCRX, et enregistrer des signaux de 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz, et 12,5kHz. Reproduire ensuite ces signaux et vérifier si la courbe est comprise dans le tableau de réponse de fréquence globale pour les bandes CrO_2 (Fig. 15) 10. Placez l'appareil en Mode pour bande Metal, changer la bande d'essai pour QZZCRZ, et enregistrer des signaux de 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz, et 12,5kHz. Reproduire ensuite ces signaux, et vérifier si la courbe est comprise dans le tableau de réponse de fréquence globale pour les bandes Métal (Fig. 15) 11. Confirmer que les courants de polarisation sont approximativement les suivants lorque le sélecteur de bande est mis sur les positions respectives. * Lisez la tension sur le voltmètre électronique et calculez le courant de prémagétisation selon la formule. Courant de prémagnétisation (A) = $\frac{\text{Tension lue sur voltm. élec. (V)}}{10\ (\Omega)}$

SECTION	MESURES ET REGLAGES
	Autour de 400μA (position Normal) **Autour de 470μA (position CrO_2)** **Autour de 780μA (position Metal)** **: Mesuré à TP1 (L-CH) et TP2 (R-CH)**
H Gain global [BANDE 2] Condition: * Positions enregistrement/lecture * Mode pour bande normal * Commande de niveau ...MAX. * Commande de niveau de sortie...MAX. * Niveaux d'entrée normaux MIC −59,5 ± 4dB LINE IN −24 ± 4dB Equipement: * Générateur AF * Voltmètre électronique * Atténuateur * Oscilloscope * Bande étalon vierge QZZCRA pour type de bande normale * Resistance (600Ω)	1. Branchez les appareils comme sur la Fig. 16. 2. Placez l'appareil en Mode pour bande normal, et charger la bande d'essai (QZZCRA). 3. Placez l'appareil en position enregistrement. 4. Appliquez un signal à 1kHz (−24dB) du générateur AF, à travers l'atténuateur, à l'entrée LINE IN. 5. Réglez l'atténuateur pour que le niveau d'écoute simultanée sur LINE OUT soit de 0,4V. 6. Lisez la bande ainsi enregistrée, et vérifiz que la valeur lue sur le voltmètre électronique branché sur LINE OUT est bien de 0,4V. 7. Si la valeur mesurée est différente, réglez VR3 (canal gauche) et VR4 (droit) (Voir Fig. 1). 8. Recommencez à partir du palier (2).
I Indicateur de niveau [BANDE 2] Condition: * Position enregistrement * Commande de niveau ...MAX. Equipment: * Voltmètre électronique * Générateur AF * Atténuateur * Resistance (600Ω)	1. Branchez les appareils comme sur la Fig. 16. 2. Comme il est montré à la Fig. 17, le branchement de la base de Q703 à la −B (polarisation) arrête les oscillations du multivibrateur instable comprenant Q702 et Q703. 3. Alimenter d'un 1kHz (−24dB) a la fiche "LINE IN", puis pousser le bouton d'enregistrement. 4. Régler le ATT de telle façon à ce que le niveau de sortie à la fiche "LINE OUT" devienne 0,4V (Le niveau d'entreé à cette position est nommé le niveau d'entree standard). 5. Réglage au "−20dB". A. Réglez l'atténuateur pour que le niveau d'entrée soit inférieur de −20dB au niveau étalon d'enregistrement B. Réglez VR701 de tel façon que le segment de −20dB s'allume dans la zone de −20 ± 0,8dB (L-CH seulement) (Voir Fig. 18). 6. Réglage au "0dB". A. Régler le ATT de telle façon à ce que le niveau de sortie à la fiche "LINE OUT" devienne 0,4V. B. Réglez VR702 de tel façon que le segment de +1dB s'allume dans la zone de 0 ± 0,2dB du niveau d'entrée standard (Voir Fig. 19) 7. Répéter deux fois les étapes 5 à 6 ci-dessus. 8. Réglez l'ATT et vérifiez si tous les segments s'allument quand le niveau d'un signal d'entrée est augmenté de 10dB au dessus du niveau d'entrée standard (Voir Fig. 20.)
J Circuit Dolby [BANDE 2] Condition: * Position enregistrement * Commande de niveau ...MAX. * Sélecteur de Dolby ...OUT/IN Equipement: * Voltmètre électronique * Générateur AF * Atténuateur * Oscilloscope * Resistance (600Ω)	1. Branchez les appareil comme sur la Fig. 21. 2. Placez l'appareil en position enregistrement et le sélecteur Dolby en position OUT, puis appliquez un signal à 5kHz à l'entrée LINE IN pour obtenir −34,5dB sur TP11 (canal gauch) et TP12 (droit). 3. Vérifier que la valeur en position IN du sélecteur Dolby augmente de 8 (± 2,5)dB par rapport à celle obtenue en position OUT.

MESSUNGEN UND EINSTELL METHODEN

RS-M202 DEUTSCH

Verwenden Sie bitte diese Broschüre Zusammen mit der Service-Anleitung für das Modell Nr. RS-M202

Bandwähler (Band-Betriebsart-Schalten)
Zur Meßeinstellung mit Testbändern ohne Bandspürlöcher (A und B) die Band-Betriebsarten wie folgt schalten. (Für normale Band-Betriebsart einfach ein normales Band in den Cassettenhalter einführen.)

- Metallband-Betriebsart-Einstellung:
  Die Metallband-Betriebsart wird erreicht durch trennen der dreistiftigen Buchse J vom dreistiftigen Ständer J auf dem P.C.B. (Gedrucktes Schaltbrett).
- CrO_2-Band-Betriebseinstellung:
  Zuerst die dreistiftige Buchse J auf dieselbe Weise wie oben trennen. Danach, wie in rechtsstehender Abbildung gezeigt, den Anschluß −1 des dreistiftigen Ständers mit einem Verbindungsdraht erden.

Anm.:
Für gute Meßbeddingungen sorgen. Falls nicht anders angegeben, die Schalter und Regler in folgende positionen stellen.

- Für saubere Köpfe sorgen.
- Für saubere Tonwelle und Andruckrolle sorgen.
- Auf normale Raumtemperature achten: 20 ± 5°C. (68 ± 9°F)
- Dolby-Schalter: Aus.
- Spitzenwertschalter: LINE.
- Eingangsregler: MAX.
- Ausgangsregler: MAX.
- Ausgangspegelregler für BAND 1: MAX.
- Überspiel/Misch-Schalter: AUS

Gegenstand	Messung und Einstellung
Ⓐ Tonkopf-Positionierung [BAND 1 , BAND 2] Bedingung: * Wiedergabe und Pause	Die Tonkopf-Positionierplatte dient zum Einstellen des Kontakts zwischen Tonkopf und Band während der Betriebszustände „Cue" und „Review". 1. Die Wiedergabetaste PLAY und die Pausetaste drücken. 2. Den Abstand zwischen der Andrucksrolle und der Tonwelle messen. Sollwert: 0,5 ± 0,3mm 3. Falls der Meßwert außerhalb des Toleranzbereichs liegt, die Schraube (A) lösen und die Tonkopf-Positionierplatte in pfeil-richtung (B) schieben. um den Kopfkontakt einzustellen.
Ⓑ Senkrechtstellen des Kopfes [BAND 1 , BAND 2] Bedingung: * Wiedergabe Meßgerät * Röhrenvoltmeter * Oszillograf * Testband…QZZCFM	**Kopfazimut-Justierung** **Ausgangsbalance-Justierung für linken und rechten Kanal** 1. Den Meßaufbau zeigt Fig. 3 2. 8kHz-Signal des Testbandes (QZZCFM) wiedergeben. Schraube (B) in Fig. 4 auf maximalen Ausgangspegel des linken und rechten Kanals abgleichen. Wenn die Ausgangspegel des linken und rechten Kanals nicht gleichzeitig maximal sind, wie folgt justieren. 3. Durch Drehen der in Fig. 4 gezeigten Schraube die Winkel A und C (Punkt, wo der Spitzenausgangspegel fül den linken, bzw. rechten Kanal ereicht wird ermitteln. Anschließend den Winkel B zwischen dem Winkel A und C ermitteln, d.h. den Punkt, wo der Ausgangs-pegel des linken und rechten Kanals bei maximalem Pegel zusammentreffen. (Siehe Fig. 4 und 5). **Phasenjustierung für linken und rechten Kanal** 4. Den Meßaufbau zeigt Fig. 6 5. 8kHz-Signal des Testbandes (QZZCFM) wiedergeben. Schraube (B) in Fig. 4 so einstellen, daß Zeiger von zwei Röhrenvoltmetern auf Maximum ausschlagen, und am Oszillografen eine Wellenform, wie in Fig. 7 erreicht wird.
Ⓒ Bandgeschwindigkeit [BAND 1 , BAND 2] Bedingung: * Wiedergabe Meßgerät * Elektronischer * Digitalzähler * Testband…QZZCWAT	**Genauigkeit der Bandgeschwindigkeit** 1. Den Meßaufbau zeigt Fig. 8 2. Das Testband (QZZCWAT 3000 Hz) beim mittleren Teil wiedergeben und das Wiedergabesignal in den Frequenzzähler eingeben. 3. Die Messung soll im mittieren Teil des Bandes erfolgern 4. Frequenz messen. 5. Beträgt die auf dem Testband aufgezeichnete Frequenz 3000 Hz, so ergibt sich die Genauigkeit nach folgender Formal: Genauigkeit der Bandgeschwindigkeit = $\frac{f-3000}{3000}$ x 100 (%) worin f die gemessene Frequenz ist. **Normalwert: BAND 1 (Wiedergabelaufwerk)** **+1.83% ~ −1,16%** **BAND 2 (Aufnahme/Wiedergabelaufwerk)** **+1,33% ~ −1,67%** **Einstellung:** 1. Den mittleren Teil des Testbandes wiedergeben.

Gegenstand	Messung und Einstellung
	2,3. Die Einstellschraube VR Vgl Fig. 1 so verstellen, daß eine Frequenz von 3000 Hz angezeig wird. **Schwankung der Bandgeschwindigkeit:** Messung, wieoben beschrieben für Anfang, mittleren Teil und Ende des Testbandes wiederholen und Schwankung wie folgt bestimmen: Schwankung = $\frac{f_1-f_2}{3000}$ x 100 (%) f_1 = Maximalwert f_2 = Minimalwert **NORMALWERT: Weniger als 1%** **Anm:** Verwenden Sie einen nichtmetallischen Schraubenzieher wenn Sie die Bandgeschwindigkeit justieren.
Ⓓ Frequenzgand bie Wiedergabe [BAND 1 , BAND 2] Bedingung: * Wiedergabe Betriebsart „Normalband" Ausgangspegelregler für BAND 1 Meßgerät: * Röhrenvoltmeter * Oszillograf * Testband…QZZCFM	1. Den Meßaufbau zeigt Fig. 3 jedoch ist jetzt das Testband QZZCFM zu verwenden. 2. Gerät auf Betriebsart „Normal band" schalten. 3. Frequenzgand-Testband QZZCFM wiedergeben. 4. Ausgangsspannungen bei 315 Hz, 12,5 kHz, 8 kHz, 4 kHz, 1 kHz, 250 Hz, 125 Hz und 63 Hz mit Ausgangsspannung der Standard Frequenz 315 Hz vergleichen. 5. Messungen an beiden Kanälen durchfüberen. 6. Prüfen, ob die Werte innerhalb der in Fig. 9 dargestellten Kurven liegen.
Ⓔ Wiedergabe-Verstärkung [BAND 1 , BAND 2] Bedingung: * Wiedergabe * Betriebsart „Normal band" Ausgangspegelregler für BAND 1 Meßgerät * Röhrenvoltmeter * Oszillograf * Testband …QZZCFM	1. Den Meßaufbau zeigt Fig. 3 2. Standard-frequenz (OZZCFM 315 Hz, 0V) vom Testband wiedergeben und Ausgangsspannung messen. 3. Messung an beiden Kanälen durchführen. **Normalwert: BAND 1 : 0,59V ± 1dB** **BAND 2 : 0,38V ± 1dB** **Einstellung:** 1. Wenn der gemessene Wert nicht innerhalb des normalen liegt, VR201 (BAND 1 : Linker Band), VR202 (BAND 1 : Rechter kanal), VR1 (BAND 2 : Linker Kanal) und VR2 (BAND 2 : Rechter Kanal) abgleichen. 2. Nach erfolgtem Abgleich ist der Frequenzgang bei Wiedergabe erneut zu kontrollieren.
Ⓕ Löschstrom [BAND 2] Bedingung: * Aufnahme * Betriebsart „Metalband" Meßgerät: * Röhrenvoltmeter * Oszillograf	1. Den Meßaufbau zeigt Fig. 10 2. Gerät auf Betriebsart "Metalband" schalten. 3. Die Aufnahme-und Pausentaste drüken. 4. Löschstrom nach folgender Formel emitteln: Löschstrom (A) = $\frac{\text{Die Spannung üder beide Enden von R401 (V)}}{\text{1 (Ohm)}}$ **NORMALWERT: 160 $^{+10}_{-20}$ mA (Metal position)** 5. Falls der Meßwert nicht im vorgeschriebenen Bereich liegt. auf folgende Weise einstellen. **Einstellung:** 1. Die Stelle (A) unterbrechen und den Punkt (B) im Verdrahtungsplan auf der Hauptleiterplatte kurzschließen. (Siehe Seite 10) 2. Den Löschstrom messen. 3. Überprüfen, ob der gemessene Löschstrom zwischen 140 mA und 170 mA liegt. 4. Falls er außerhalb dieses Bereichs liegt, folgende Schritte ausführen. • Beträgt der Löschstrom weniger als 140 mA. den Punkt (A) kurzschließen. • Beträgt der Löschstrom mehr als 170 mA. die Stellen (A) und (B) unterbrechen.

Gegenstand	Messung und Einste
Ⓖ Gesamt-frequenzgang [BAND 2] Bedingung: * Aufnahme und Wiedergabe * Betriebsart „Normal band" * Betriebsart „CrO_2 band" * Betriebsart „Metalband" * Eingangsregler…MAX Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Oszillograf * Testband (Leerband) QZZCRA für Normal QZZCRX für CrO_2 QZZCRZ für Metal * Widerstand (600Ω)	**Anm.** Vor Messung und Abgleich des Gesamtfrequen der Frequenzgang bei Wiedergabe korrekt ist (V **Gesamtfrequenzgang-Justierung durch Aufnah** (• Der Aufnahmeentzerrer ist fest einges 1. Den Meßaufbau zeigt Fig. 12. 2. Gerät auf Betriebsart „Normal Band" schal einlegen. 3. An LINE IN ein Signal von 1 kHz, −24 dB zu Aufnahmezustand versetzen. 4. Den Dämpfungswiderstand feineinstellen, OUT 0,4 V beträgt. * Überprüfen, daß der Signalausgangspege von 0,4 V −24 ± 4 dB beträgt. 5. Den Dämpfungswiderstand so einstellen, d 20 dB reduziert wird. 6. Mit dem NF-Oszillator Signale von 50 Hz, 1 8 kHz, 10 kHz zuführen, und diese Signale a 7. Die in Schritt 6 aufgezeichneten Signale wi die Frequenzgangkurve innerhalb des Berei diagramm für normales Band in Fig. 11 gez innerhalb des vorgeschriebenen Bereichs li 11 weiterfahren.) Falls die Kurve außerhalb des vorgeschrieb justieren. Justierung Ⓐ : Wenn die Kurve den vorgeschriebenen Gesamt-frequenzgangbereich (Fig. 11) überschreitet, wie in Fig. 13 gezeigt.: 1) Den Vormagnetisierungsstro-m durch Drehen von VR 401 (linker Kanal) und VR 402 (rechter Kanal) erhöhen. (S. Fig. 1) 2) Die Schritte 6 und 7 zur Überprüfung wiederholen. (Wenn die Kurve dabei innerhalb des vorgeschriebenen Bereichs liegt (Fig. 11) mit den Schritten 8, 9, 10 und 11 weiterfahren. 3) Wenn die Kurve den vorgeschriebenen Bereich (Fig. 11) noch immer überschreitet, den Vormagnetisierungsstro-m weiter erhöhen, und die Schritte 6 und 7 wiederholen. Justieru Wenn d vorgesch den Ges (Fig. 11) Fig. 14 1) Den Vorm m d VR4 VR4 redu 2) Die Übe hole dab gese in F Schr weit 3) Falls imm vorg Bere den stro und wied 8. Gerät auf Betriebsart „CrO_2 band" schalter 9. Testband QZZCRX einlegen, und Signale vo 1 kHz, 4 kHz, 8 kHz, 10 kHz und 12, 5kHz auf Signale wiedergeben und prüfen, ob die Ku Gesamtfrequenzgangdiagramm für CrO_2-ba 10. Gerät auf Betriebsart „Metalband" schalte und Signale von 50 Hz, 100Hz, 200 Hz, 500 H 12,5 kHz aufnehmen. Anschließend die Sig die Kurve innerhalb des Bereichs im Gesa Metalband liegt. (Fig. 15) 11. Überprüfen, daß die Vormagnetisierungss Werten entsprechen, wenn der Betriebsart gestellt ist. * Spannung vom Röhrenvoltmeter ablesen und folgender Formel berechnen:

Messung und Einstellung
2,3. Die Einstellschraube VR Vgl Fig. 1 so verstellen, daß eine Frequenz von 3000 Hz angezeig wird. **Schwankung der Bandgeschwindigkeit:** Messung, wieoben beschrieben für Anfang, mittleren Teil und Ende des Testbandes wiederholen und Schwankung wie folgt bestimmen: Schwankung = $\frac{f_1 - f_2}{3000}$ x 100 (%) f_1 = Maximalwert f_2 = Minimalwert **NORMALWERT: Weniger als 1%** **Anm:** Verwenden Sie einen nichtmetallischen Schraubenzieher wenn Sie die Bandgeschwindigkeit justieren.
1. Den Meßaufbau zeigt Fig. 3 jedoch ist jetzt das Testband QZZCFM zu verwenden. 2. Gerät auf Betriebsart „Normal band" schalten. 3. Frequenzgand-Testband QZZCFM wiedergeben. 4. Ausgangsspannungen bei 315 Hz, 12,5 kHz, 8 kHz, 4 kHz, 1 kHz, 250 Hz, 125 Hz und 63 Hz mit Ausgangsspannung der Standard Frequenz 315 Hz vergleichen. 5. Messungen an beiden Kanälen durchfüberen. 6. Prüfen, ob die Werte innerhalb der in Fig. 9 dargestellten Kurven liegen.
1. Den Meßaufbau zeigt Fig. 3 2. Standard-frequenz (OZZCFM 315 Hz, 0V) vom Testband wiedergeben und Ausgangsspannung messen. 3. Messung an beiden Kanälen durchführen. **Normalwert: BAND [1]: 0,59V ± 1dB** **BAND [2]: 0,38V ± 1dB** **Einstellung:** 1. Wenn der gemessene Wert nicht innerhalb des normalen liegt, VR201 (BAND [1]: Linker Band), VR202 (BAND [1]: Rechter kanal), VR1 (BAND [2]: Linker Kanal) und VR2 (BAND [2]: Rechter Kanal) abgleichen. 2. Nach erfolgtem Abgleich ist der Frequenzgang bei Wiedergabe erneut zu kontrollieren.
1. Den Meßaufbau zeigt Fig. 10 2. Gerät auf Betriebsart "Metalband" schalten. 3. Die Aufnahme-und Pausentaste drüken. 4. Löschstrom nach folgender Formel emitteln: Löschstrom (A) = Die Spannung üder beide Enden von R401 (V) / 1 (Ohm) **NORMALWERT: 160 $^{+10}_{-20}$ mA (Metal position)** 5. Falls der Meßwert nicht im vorgeschriebenen Bereich liegt. auf folgende Weise einstellen. **Einstellung:** 1. Die Stelle (A) unterbrechen und den Punkt (B) im Verdrahtungsplan auf der Hauptleiterplatte kurzschließen. (Siehe Seite 10) 2. Den Löschstrom messen. 3. Überprüfen, ob der gemessene Löschstrom zwischen 140 mA und 170 mA liegt. 4. Falls er außerhalb dieses Bereichs liegt, folgende Schritte ausführen. • Beträgt der Löschstrom weniger als 140 mA. den Punkt (A) kurzschließen. • Beträgt der Löschstrom mehr als 170 mA. die Stellen (A) und (B) unterbrechen.

Gegenstand	Messung und Einstellung
Ⓖ Gesamt-frequenzgang [BAND 2] Bedingung: * Aufnahme und Wiedergabe * Betriebsart „Normal band" * Betriebsart „CrO_2 band" * Betriebsart „Metalband" * Eingangsregler...MAX Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Oszillograf * Testband (Leerband) QZZCRA für Normal QZZCRX für CrO_2 QZZCRZ für Metal * Widerstand (600Ω)	**Anm.** Vor Messung und Abgleich des Gesamtfrequenzganges ist sicherzu-stellen, daß der Frequenzgang bei Wiedergabe korrekt ist (Vgl. entspr. Abschnitt). **Gesamtfrequenzgang-Justierung durch Aufnahme-Vormagnetisierungsstrom** (• Der Aufnahmeentzerrer ist fest eingestellt.) 1. Den Meßaufbau zeigt Fig. 12. 2. Gerät auf Betriebsart „Normal Band" schalten, und Test Band (QZZCRA) einlegen. 3. An LINE IN ein Signal von 1kHz, −24dB zuführen. Das Gerät in den Aufnahmezustand versetzen. 4. Den Dämpfungswiderstand feineinstellen, bis die Ausgangsleistung au LINE OUT 0,4V beträgt. * Überprüfen, daß der Signalausgangspegel bei einer Ausgangs-Spannung von 0,4V −24 ± 4dB beträgt. 5. Den Dämpfungswiderstand so einstellen, daß der Eingangssignal-pegel um 20dB reduziert wird. 6. Mit dem NF-Oszillator Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz zuführen, und diese Signale auf das Testband aufzeichnen. 7. Die in Schritt 6 aufgezeichneten Signale wiedergeben, und überprüfen, ob die Frequenzgangkurve innerhalb des Bereichs liegt, der im Frequenzgang-diagramm für normales Band in Fig. 11 gezeigt ist. (Falls die Kurve innerhalb des vorgeschriebenen Bereichs liegt, mit den Schritten 8,9, 10 und 11 weiterfahren.) Falls die Kurve außerhalb des vorgeschriebenen Bereichs liegt, wie folgt justieren. Justierung Ⓐ : Wenn die Kurve den vorgeschriebenen Gesamt-frequenzgangbereich (Fig. 11) überschreitet, wie in Fig. 13 gezeigt.: 1) Den Vormagnetisierungsstro-m durch Drehen von VR 401 (linker Kanal) und VR 402 (rechter Kanal) erhöhen. (S. Fig. 1) 2) Die Schritte 6 und 7 zur Überprüfung wiederholen. (Wenn die Kurve dabei innerhalb des vorgeschriebenen Bereichs liegt (Fig. 11) mit den Schritten 8, 9, 10 und 11 weiterfahren. 3) Wenn die Kurve den vorgeschriebenen Bereich (Fig. 11) noch immer überschreitet, den Vormagnetisierungsstro-m weiter erhöhen, und die Schritte 6 und 7 wiederholen. Justierung Ⓑ : Wenn die Kurve unter den vorgeschriebenen Bereich für den Gesamtfrequenzgang (Fig. 11) absinkt, wie in Fig. 14 gezeigt: 1) Den Vormagnetisierungsstro-m durch Drehen von VR401 (linker Kanal) und VR402 (rechter Kanal) reduzieren. 2) Die Schritte 6 und 7 zur Überprüfung wieder-holen. (Falls die Kurve dabei innerhalb des vor-geschriebenen Bereichs in Fig. 11 liegt, mit den Schritten 8, 9, 10 und 11 weiterfahren.) 3) Falls die kurve noch immer unter den vorgeschriebenen Bereich (Fig. 11) absinkt, den Vormagnetisierungs-strom weiter reduzieren, und Schritte 6 und 7 wiederholen. 8. Gerät auf Betriebsart „CrO_2 band" schaltern. 9. Testband QZZCRX einlegen, und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 12, 5kHz aufzeichnen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für CrO_2-band liegt. (Fig. 15) 10. Gerät auf Betriebsart „Metalband" schalten. Test-band QZZCRZ einlegen und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 12,5kHz aufnehmen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für Metalband liegt. (Fig. 15) 11. Überprüfen, daß die Vormagnetisierungsströme ungefähr den folgenden Werten entsprechen, wenn der Betriebsart in die entsprechende Position gestellt ist. * Spannung vom Röhrenvoltmeter ablesen und Vormagnetisierungs-strom nach folgender Formel berechnen:

Gegenstand	Messung und Einstellung
	Vormagnetisierungsstrom (A) = Spannung am Röhrenvoltmeter (V) / 10 (Ω) **Ungefähr 400μA (Normal position)** **Ungefähr 470μA (CrO_2 position)** **Ungefähr 780μA (Metal position)** **: Gemessen an TP1 (L-CH) und TR2 (R-CH)**
Ⓗ Gesamt-Verstärkung [BAND 2] Bedingung: * Aufnahme und Wiedergabe * Betriebsart "Normal band" * Eingangsregler...Max. * Ausgangsregler...Max. * Standard-Eingangspergel Mikrofon −59,5 ± 4dB NF-Eingang −24 ± 4dB Meßgerät: * NF-Generator * Röhrenvoltmeter * Abschwächer * Oszillograf * Testband (Leerband) QZZCRA für Normal * Widerstand (600Ω)	1. Den Meßaufbau zeigt Fig. 16. 2. Gerät auf Betriebsart „Normal Band" schalten und Test-Band (QZZCRA) einlegen. 3. Gerät „Aufnahme". 4. Über den Sbschwächer 1kHz aus dem NF-Generator (−24dB) dem NF-Eingang zuführen. 5. Den Abschwächer so einstellen, daß am MF-Ausgang stehen. 0,4V stehen. 6. Diese Aufnahme wiedergeben und prüfen, ob am NF-Ausgang 0,4V stehen. 7. Ist des nicht der Fall, so sind VR3 (linker Kanal) und VR4 (rechter Kanal) entsprechend abzugleichen (Siehe Fig. 1) 8. Ab Punkt 2 wiederholen.
Ⓘ Fluorezenzmeter [BAND 2] Bedingung: * Aufnahme * Eingangsregler...MAX. Meßogerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Widerstand (600Ω)	1. Den Meßaufbau zeigt Fig. 16. 2. Wie aus Fig. 17 ersichtlich, hört der astabile, aus den Transistoren Q702 und Q703 bestehende Multivibrator zu schwingen auf, wenn der −B (Vorspannung) des Q703 mit Masse verbunden wird. 3. Signal vor 1kHz (−24dB) an die Line IN-Buchse eingeben und die Aufnahmetaste drüken. 4. ATT so abstimmen, daß der Ausgangspegel au der LINE OUT-Buchse 0,4V wird. (Der Eingangspegel in dieser Stellung wird als Standardpegel bezeichnet). 5. Justierung auf „−20dB". A. Den Abschwächter so einstellen, daß der Eingangspegel −20dB des Stand-Aufnahmepegels beträge B. VR701 so abgleichen, daß im Bereich von −20 ± 0,8dB das Segment −20dB aufleuchtet (NUR LINKER KANAL) (S. Fig. 18) 6. Justierung auf „0dB". A. ATT so abstimmen, daß der Ausgangspegel an der LINE OUT-Buchse, 0,4V wird. B. VR702 so abgleichen, daß im Bereich von 0 ± 0,2dB um den standardpegel das Segment + 1dB aufleuchtet (S. Fig. 19) 7. Die Anleitungsschritte 5 bis 6 zweimal wiederholen. 8. Die ATT einstellen; kontrollieren, ob alle Segmente aufleuchten, wenn der Eingangspegel 10dB höher als der Stadardpegel ist (S. Fig. 20)
Ⓙ Dolby-Schaltung [BAND 2] Bedingung: * Aufnahme * Eingangsregler...Max. * Dolby-Schalter ...OUT/IN Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Oszillograf * Widerstand (600Ω)	1. Die Verrindungen des Prüfaufbaus sind in Fig. 21 wiedergegeben. 2. Gerät in Stellung „Aufnahme" betreiben und Dolby-Schalter ausschalten. Dem NF-Eingang ein 5kHz-Signal zuführen, daß and TP11 (Linker Kanal) und TP12 (Rechter Kanal) −34,5dB erhalten werden. 3. Prüfen. ob das Signal bei eingeschaltetem Dolby-Schalter um 8 (± 2,5)dB größer ist als bei ausgeschaltetem Dolby-Schalter.